Forest and Woodl
Habitat Types (Pla
Associations) of
Northern New Mexico
and Northern Arizona

United States
Department of
Agriculture

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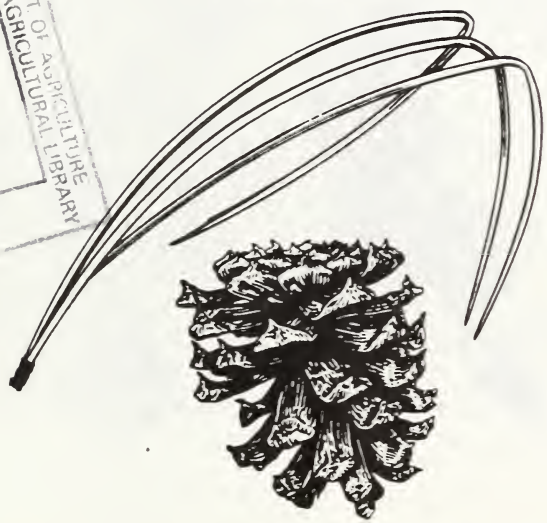

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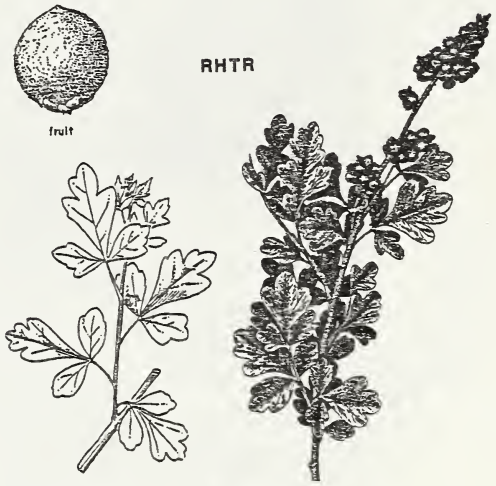
GEOGRAPHIC NOTE

The area covered by this guide includes New Mexico and Arizona north of interstate highway I-40. For habitat types south of I-40, see USDA Forest Service (1986b).



Rhus trilobata (skunkbush sumac)

Using the Key and Descriptions

The key works best in stands from late successional to near climax stages. Stands in early to mid-seral stages generally will not key directly to their association. In young or recently disturbed stands the association must be inferred from site factors, indicator species, tree successional relationships, or from known successional stages. Fortunately, climax can usually be inferred from the most shade tolerant tree species that is successfully reproducing. The difficulty of young or mid-seral stands can also be minimized by finding the most mature stand on a similar site in the local landscape and applying the key to that stand.

To use the key, determine the combination of potential climax tree species by noting especially the proportions of trees in young, regenerating sizes. This helps identify the climax series, using the first of the keys below. The following keys A-G are based on forest and woodland series. In these keys it is necessary to identify certain understory shrubs and herbs (key species) and to note their canopy coverage. Coverage classes are defined by the adjectives and nouns below.

Proceed through the key making careful observations required at each decision couplet. For difficult decisions go both ways. Validate the determination against the description which fits your observations best. Check your observations if descriptions do not agree. No stand will fit the description perfectly.

KEY ADJECTIVES AND NOUNS

ABSENT - cannot be found in stand (opp = present)
ACCIDENTAL - individuals very infrequent, occasional, or limited to special microsites.
ABUNDANT - canopy coverage > 25%.
COMMON - canopy coverage > 1% (opp = scarce).
DOMINANT - Density or cover is as great as, or greater than, any other species of the same life form (two or more species can be dominant, i.e. codominant).
LUXURIANT - canopy coverage > 50%.
POORLY REPRESENTED - canopy coverage < 5% (opp = well represented).
PRESENT - individuals can be found in the stand (opp = absent).
REGENERATION - understory trees as established seedlings, saplings, or small poles (dbh < 10 in.).
SCARCE - canopy coverage < 1% (opp = common).
WELL REPRESENTED - canopy coverage > 5% (opp = poorly represented).

Key to Forests and Woodlands

1. Dominant trees at climax are Pinus aristata (bristlecone pine), Pinus edulis (pinyon pine), or Juniperus (Junipers)----------KEY G
1. Dominant trees at climax are not the above species or include other trees as well...2

2. Forests of streamsides with riparian obligate plants, such as Populus angustifolia (narrow-leaf cottonwood), Alnus tenuifolia (thinleaf alder), or Salix bebbiana (Bebb willow)------RIPARIAN FORESTS (48)
2. Forests of other environments without riparian obligate plants...3

3. Forests of talus or debris slopes with fragmental soils (gravels and cobbles are more than 90% soil volume)-------SCREE FORESTS (47)
3. Forests of other environments...4

4. Pinus flexilis (limber pine) is a climax tree...13
4. Pinus flexilis is seral or absent...5

5. Picea engelmannii (Engelmann spruce) is dominant or reproducing successfully, clearly not accidental...6
5. Picea engelmannii absent, or accidental...8

6. Abies lasiocarpa (corkbark or subalpine fir) and Picea pungens (blue spruce) both absent or scarce----------KEY A
6. Abies lasiocarpa or Picea pungens common...7

7. Picea pungens (blue spruce) absent or scarce----------KEY B
7. Picea pungens common----------KEY C

8. Abies lasiocarpa (corkbark or subalpine fir) common----------KEY B
8. Abies lasiocarpa absent or accidental...9

9. Picea pungens (blue spruce) reproducing successfully, clearly not accidental----------KEY C
9. Picea pungen absent or accidental...10

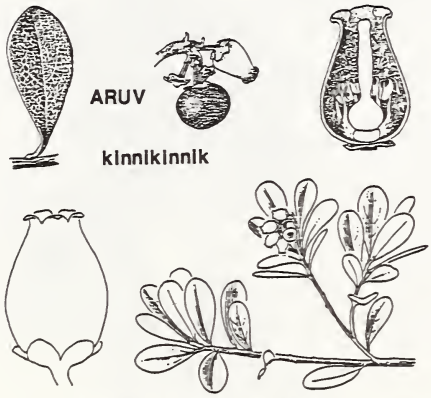
10. Abies concolor (white fir) reproducing successfully, clearly not accidental----------KEY D
10. Abies concolor absent or accidental...11

11. Pseudotsuga menziesii (Douglas-fir) reproducing successfully, clearly not accidental...12
11. Pseudotsuga menziesii absent or accidental----------KEY F

12. Pinus ponderosa (ponderosa pine) is seral or absent, clearly not a major climax dominant----------KEY E
12. Pinus ponderosa is a major climax dominant----------KEY F

13. Arctostaphylos uva-ursi (kinnikinnik) well represented----------PIFL/ARUV (20)
13. Arctostaphylos uva-ursi poorly represented or absent...14

14. Festuca arizonica (Arizona fescue) common----------PSME/FEAR, PIFL phase (33)
14. Festuca arizonica absent or scarce----------PSME/MUMO PIFL phase (34)



Arctostaphylos uva-ursi

Key A - Picea engelmanni (Engelmann Spruce) Series

1. Herbs and shrubs scarce----------PIEN/MOSS (3)
1. Herbs or shrubs at least common...2

2. Saturated soils----------ABLA/MECI (10)
2. Soils otherwise...3

3. Understory essentially shrubby...6
3. Understory essentially herbaceous...4

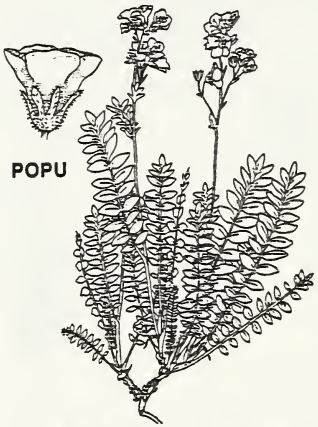
4. Forests near timberline with plants of tundra affinity, such as *Geum rossii* (alpine avens), common...5
4. Forest of lower elevations often with luxuriant herb cover----PIEN/EREX (1)

5. *Vaccinium* species (huckleberry, grouse wortleberry) present---PIEN/VAMY/POPU (5)
5. *Vaccinium* absent; San Francisco Peaks, AZ----------PIEN/GERO (2)

6. *Vaccinium* species (huckleberry, grouse wortleberry) present...7
6. *Vaccinium* absent...8

7. *Polemonium pulcherrimum* (Jacob's ladder) common----------PIEN/VAMY/POPU (5)
7. *Polemonium pulcherrimum* scarce or absent----------PIEN/VAMY (4)

8. *Arctostaphylos uva-ursi* (Kinnikinnik) common----------PIFL/ARUV (20)
8. *Arctostaphylos uva-ursi* absent----------PIEN/RIMO (6)



Polemonium pulcherrimum
(skunkleaf jacob's ladder)

Key B – Abies lasiocarpa (corkbark fir, subalpine fir) Series

1. Herbs and shrubs scarce----------ABLA/MOSS (11)
1. Herbs or shrubs at least common...2

2. Saturated soils----------ABLA/MECI (10)
2. Soils otherwise...3

3. Picea pungens (blue spruce) common, reproducing well even in mid to late sucession...8
3. Picea pungens absent or accidental...4

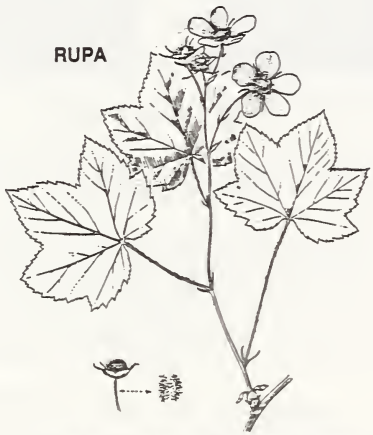
4. Herbs luxuriant...5
4. Herbs common to abundant...6

5. Erigeron eximius (forest fleabane) scarce; Lathyrus arizonicus (Arizona peavine) usually well represented----------ABLA/LAAR (9)
5. Erigeron eximius usually common----------ABLA/EREX (7)

6. Vaccinium myrtillus (myrtle leaf huckleberry) well represented--ABLA/VAMY (13)
6. Vaccinium myrtillus absent or poorly represented...7

7. Rubus parviflorus (thimbleberry) scarce, Juniperus communis (common or ground juniper) common----------ABLA/JUCO (8)
7. Rubus parviflorus at least common----------ABLA/RUPA (12)

8. Linnaea borealis (twinflower) well represented----------PIPU/LIBO (19)
8. Linnaea borealis absent or scarce----------PIPU/EREX (17)



Rubus parviflorus (thimbleberry)

Key C – Picea pungens (blue spruce) Series

1. Forests of streamsides or streamside terraces with riparian obligate shrubs, such as Alnus (alder) Salix bebbiana (Bebb willow), or Cornus stolonifera (red ozier dogwood)---PIPU/COST (16)
1. Forests without riparian obligate shrubs...2

2. Pinus ponderosa (ponderosa pine) is a common seral tree (often persisting in late succession)...3
2. Pinus ponderosa absent or accidental, even in early succession...6

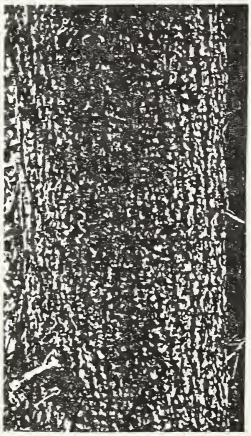
3. Understory bunchgrasses, such as Festuca arizonica (Arizona fescue) well represented----------PIPU/FEAR (18)
3. Understory shrubby or herbaceous, but bunchgrasses poorly represented...4

4. Arctostaphylos uva-ursi (Kinnikinnik) well represented---------PIPU/ARUV (14)
4. Arctostaphylos uva-ursi poorly represented...5

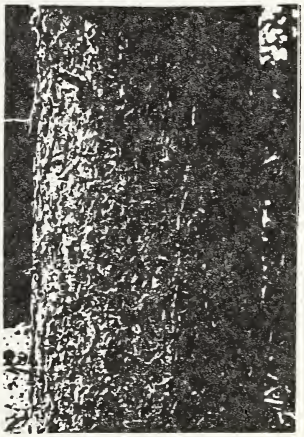
5. Grasses and sedges (graminoids) abundant----------PIPU/CAFO (15)
5. Forbs abundant; graminoids common or well represented in small patches----------PIPU/EREX,PIPO phase (17)

6. Linnaea borealis well represented----------PIPU/LIBO (19)
6. Linnaea borealis absent or poorly represented----------PIPU/EREX (17)

Bark of mature spruces



Blue spruce



Engelmann spruce

Key D – Abies concolor (white fir) Series

1. Herbs and shrubs scarce (except sometimes Juniperis communis, ground juniper)----------ABCO/BERE (23)
1. Herbs or shrubs at least common...2

2. Herbaceous cover luxuriant...3 (see also 8)
2. Herbaceous cover common to abundant...5

3. Erigeron eximius (forest fleabane) usually well represented-------ABCO/EREX (24)
3. Erigeron eximius absent to poorly represented...4

4. Lathyrus arizonica (Arizona peavine) well represented----------ABCO/LAAR (26)
4. Carex foenea (foeny sedge) or other herbs well represented--------ABCO/RONE (28)

5. Quercus gambelii (Gambel oak) well represented----------ABCO/QUGA (27)
5. Quercus gambelii poorly represented...6

6. Vaccinium myrtillus (myrtleleaf huckleberry) well represented-----ABCO/VAMY (30)
6. Vaccinium myrtillus absent or poorly represented...7

7. Arctostaphylos uva-ursi (kinnikinnik) well represented----------ABCO/ARUV (22)
7. Arctostaphylos uva-ursi poorly represented...8

8. Bunchgrasses (Festuca arizonica, Arizona fescue, Danthonia parryi Parry oatgrass; Muhlenbergia montana, mountain muhly) well represented----------ABCO/FEAR (25)
8. Above bunchgrasses poorly represented...9

9. Robinia neomexicana (New Nexico locust) common, often well represented in openings----------ABCO/RONE (28)
9. Robinia neomexicana uncommon...10

10. Acer glabrum (Rocky Mountain maple) or Salix scouleriana (forest willow) common----------ABCO/ACGL (21)
10. Above species absent or scarce...11

11. Essentially shrubby understories (excluding Robinia neomexicana, New Mexico locust----------ABCO/SYOR (29)
11. Essentially herbaceous understories; shrubs (except sometimes Robinia neomexicana or Berberis repens Oregon grape) poorly represented...12

12. Lathyrus arizonica (Arizona peavine) well represented----------ABCO/LAAR (26)
12. Lathyrus arizonica poorly represented----------ABCO/RONE (28)

Key E – Pseudotsuga menziesii (Douglas-fir) Series

1. Herbs poorly represented----------PSME/BERE (31)
1. Herbs well represented...2

2. Quercus gambelii (Gambel oak) well represented----------PSME/QUGA (36)
2. Gambel oak poorly represented...3

3. Herbs luxuriant...4
3. Herbs not luxuriant...5

4. Festuca arizonica (Arizona fescue) common----------PSME/FEAR (33)
4. Festuca arizonica scarce or absent----------PSME/BRCI (32)

5. Festuca arizonica (Arizona fescue) or Poa pratensis (Kentucky bluegrass) common; shrubs poorly represented----------PSME/FEAR (33)
5. Above grasses scarce or shrubs well represented...6

6. Pinus ponderosa (ponderosa pine) absent or seral ... 8
6. Pinus ponderosa climax; Pseudotsuga menziesii is sometimes co-climax...7

7. Cowania mexicana (Cliffrose) well represented----------PIPO/COME (40)
7. Cowania mexicana scarce or absent----------PSME/MUMO (34)

8. Populus tremuloides (aspen) is a major seral tree----------ABCO/ACGL (21)
8. Populus tremuloides is absent or scarce even in young stands---PSME/PHMO (35)

Salix scouleriana (Forest willow)

Key F – Pinus ponderosa (Ponderosa pine) Series

1. Very open forests on sand dunes, cinders, or rockland...10
1. Forests and environments otherwise...2

2. Understory essentially grassy, shrubs poorly represented...3
2. Shrubs well represented in understory...5

3. Festuca arizonica (Arizona fescue) common----------PIPO/FEAR (41)
3. Festuca arizonica scarce or absent...4

4. Bouteloua gracilis (blue grama) well represented----------PIPO/BOGR (39)
4. Bouteloua gracilis poorly represented...12

5. Oaks (Quercus spp.) well represented...6
5. Oaks absent or poorly represented...7

6. Quercus undulata (wavyleaf oak) well represented----------PIPO/QUUN (45)
6. Quercus undulata absent or poorly represented----------PIPO/QUGA (44)

7. Arctostaphylos uva-ursi (kinnikinnik) well represented---------PIPO/ARUV (38)
7. Arctostaphylos uva-ursi absent...8

8. Cowania mexicania (cliffrose), Purshia tridentata, (bitterbrush), or their hybrids well represented----------PIPO/COME (40)
8. Above shrubs absent or poorly represented...9

9. Artemisia arbuscula (low sagebrush) well represented----------PIPO/ARARN (37)
9. Artemisia tridentata (big sagebrush) well represented----------PIPO/BOGR (39)

10. Rockland (soils < 4 in. deep over most of area)----------PIPO/Rockland (46)
10. Sandy or cindery soils...11

11. Sandy soils----------PIPO/ORHY (43)
11. Soils of volcanic cinder cones----------PIPO/BOGR, ANHA phase (39)

12. Pseudotsuga menziesii (Douglas-fir) reproducing successfully, not accidental----------PSME/MUMO (34)
12. Pseudotsuga menziesii absent or accidental----------PIPO/MUMO (42)

Key G - WOODLANDS: Pinus aristata, Pinus edulis, Juniperus Series (Bristlecone pine, Pinyon pine, Juniper Series)

1. Woodlands on slopes > 40% with rocky or bouldery soils and much rock outcrop or bare rock----------SCARP WOODLAND (1W)
1. Woodlands on slopes < 40% or soils not as above...2

2. Pinus aristata (bristlecone pine) present...31
2. Pinus aristata absent...3

3. Open woodlands dominated by Juniperus (Pinus edulis scarce or absent), mature trees mostly < 5m (16 ft.) tall...24
3. Open or closed woodlands with Pinus edulis common and climax or coclimax with Juniperus...4

4. Arctostaphylos pungens (manzanita) or Coleogyne ramosissima (blackbrush) well represented...23
4. Above shrubs scarce or absent...5

5. Oaks well represented...6
5. Oaks absent or poorly represented...7

6. Quercus undulata (wavyleaf oak) at least common----------PIED/QUUN (17W)
6. Quercus undulata absent or scarce----------PIED/QUGA (16W)

7. Open woodlands on rockland (soils < 4 inches deep)----------PIED/Rockland (18W)
7. Woodlands of other environments...8

8. Understory essentially shrubby...9
8. Understory not shrubby...16

9. Cercocarpus montana (mountain mahogany) common or well represented----------PIED/CEMO (12W)
9. Cercocarpus montana not common or well represented...10

10. Artemisia tridentata (big sage) or Purshia tridentata (Bitterbrush) common or well represented...11
10. Both shrubs above scarce or absent...14

11. Purshia tridentata (bitterbrush) common----------PIED/PUTR (15W)
11. Purshia tridentata scarce or absent...12

12. Cowania stansburiana (cliffrose) common----------PIED/COME, ARTR phase (9W)
12. Cowania stansburiana scarce or absent...13

13. Chrysothamnus nauseosus (rabbitbrush) or Fallugia paradoxa (Apache plume) common along washes----------PIED/CHNA-FAPA (11W)
13. Above shrubs scarce or absent----------PIED/ARTR (7W)

14. Sandy soils; Artemisia filifolia (sand sage) or Andropogon hallii (sand bluestem) present to abundant----------PIED/ANHA (5W)
14. Soils otherwise; Artemisia filifolia or Andropogon hallii scarce or absent...15

15. Cowania mexicana (cliff rose) present to abundant----------PIED/COME (9W)
15. Chrysothamus nauseosus (rabbitbrush) or Fallugia paradoxa (Apache plume) common to abundant along streamsides, washes, or deep cinder soils----------PIED/CHNA-FAPA (11W)

16. Understory scarce (mostly annuals)----------PIED/sparse (19W)
16. Understory essentially grassy; shrubs scarce to well represented...17

17. Festuca arizonica (Arizona fescue) present----------PIED/FEAR (13W)
17. Festuca arizonica absent...18

18. Sandy soils; Andropogon hallii (sand bluestem) or Muhlenbergia pungens (sandhill muhly) common to abundant----------PIED/ANHA (5W)
18. Soils otherwise; above grasses absent or scarce...19

19. Stipa columbiana, S. Schribner (Western or Schribner needlegrass) common to well represented----------PIED/STCO3 (20W)
19. Above grasses scarce to poorly represented...20

20. Herbaceous cover < 5% with stony soils and often steep slopes----------PIED/BOGR, hill-
20. Herbaceous cover well represented...21 slope phase (8W)

21. Poa fendleriana (mutton grass) common ----------PIED/POFE (14W)
21. Poa fendleriana absent or scarce.....22

22 Juniperus osteosperma (Utah juniper) and Bouteloua gracilis common----------PIED/BOGR, JUOS (8W)
22. Juniperus osteosperma scarce or absent----------PIED/BOGR, JUMO (8W)

23. Arctostaphylos pungens (manzanita) well represented--------PIED/ARPU (6W)
23. Coleogne ramisissima (blackbrush) well represented---------PIED/CORA (10W)

24. Deep sandy soils with Andropogon hallii (sand bluestem), Muhlenbergia pungens (sandhill muhly), or Dalea scoparia (sand indigobush)----------JUMO/ANHA (21W)
24. Soils and vegetation otherwise...25

25. Perennial herbs scarce----------JUOS-JUMO/
25. Perennial herbs common...26 sparse (30W)

26. Calcareous soils with Ceratoides lanata (winterfat) well represented----------JUMO/CELA (26W)
26. Soil or vegetation otherwise...27

27. Sandy or gravelly washes or deep cinder deposits with Chrysothamnus nauseosus (rabbitbrush) or Fallugia paradoxa (Apache plume)---------- JUMO/CHNA-FAPA
27. Soils or dominant shrubs otherwise...28 (27W)

28. Artemisia tridentata (big sagebrush) well represented...33
28. Artemisia tridentata absent or poorly represented...29

29. Grassy savanna; oaks poorly represented...30
29. Quercus undulata (wavyleaf oak) well represented, grasses scarce to abundant----------JUMO/QUUN (28W)

30. Juniperus monosperma (one seed juniper) dominant...34
30. Juniperus osteosperma (Utah juniper) dominant----------JUOS/BOGR (25W)

31. Ribes (currents) common, grasses poorly represented----------PIAR/RIMO (4W)
31. Ribes scarce, grasses well represented...32

32. Festuca thurberi (thurber fescue) common----------PIAR/FETH (3W)
32. Festuca thurberi absent or scarce----------PIAR/FEAR (2W)

33. Juniperus osteosperma (Utah juniper) dominant----------JUOS/ARTR (29W)
33. Juniperus monosperma (one seed juniper) dominant----------JUMO/ARTR (23W)

34. Bouteloua curtipendula (side oats grama) common; often colluvial soils of hillslopes----------JUMO/BOCU (24W)
34. Bouteloua curtipendula scarce; often alluvial soils of valley plains or piedmont fans----------JUMO/BOGR (25W)

Artemisia tridentata (Big sage)

Format of the Descriptions

DESCRIPTIONS OF EACH PLANT ASSOCIATION (HABITAT TYPE) ARE ARRANGED IN THE FOLLOWING SEQUENCE:

NAME - BOTANIC, COMMON, AND CODE NAMES ARE GIVEN.

CODE - THIS IS A NUMBER FOR ASSOCIATIONS AND PHASES AS USED IN AUTOMATED TIMBER STAND FILES.

SYN - SYNONOMY, OR OTHER NAMES FOR THE ASSOCIATION OR HABITAT TYPE APPEARING IN PUBLISHED LITERATURE.

SITE - GENERAL ENVIRONMENTAL FEATURES OF THE PLANT ASSOCIATION; MAP = MEAN ANNUAL PRECIPITATION. THE RANGE OF SOILS IS GIVEN IN VARIOUS TES REPORTS.

TES - LIFE ZONES AND ELEVATIONAL SUBZONES ALONG A CLIMATIC GRADIENT FROM INFORMATION IN THE TERRESTRIAL ECOSYSTEM SURVEY (TES). CODING IS AS FOLLOWS:

CODE	LIFEZONE	CODE	ELEVATIONAL SUBZONE
4	Woodlands	-1	warm, dry
5	Ponderosa pine	0	typical or modal
6	Mixed conifer	+1	cool, wet
7	Subalpine forest		

CLIMATES ARE CODED AS FOLLOWS: HSC - HIGH SUN COLD, LSC - LOW SUN COLD, LSM - LOW SUN MILD. CONSULT TES HANDBOOK FOR DETAILED DESCRIPTIONS OF THESE CLIMATES. IF NO CLIMATIC CODE IS GIVEN, IT IS ASSUMED TO BE LSC.

TREES - TREES ARE CODED AS FOLLOWS: ABLA = Abies lasiocarpa, PIEN = Picea engelmannii, PIPU = Picea pungens, POTR = Populus tremuloides, POAN = Populus angustifolia, ABCO = Abies concolor, PSME = Pseudotsuga meenziesii, PIAR = Pinus aristata, PIFL = Pinus flexilis (= Pinus strobiformis) PIPO = Pinus ponderosa, QUGA = Quercus gambelii, PIED = Pinus edulis, JUSC = Juniperus scopulorum, JUDE = Juniperus deppeana, JUMO = Juniperus monosperma, JUOS = Juniperus osteosperma.

Note: Pinus flexilis and P. strobiformis can be indistinguishable over portions of this area.

TREE SUCCESSIONAL STATUS IS GIVEN AS FOLLOWS:

CODE	STATUS	CONCEPT
C	Major Climax	Species is clearly regenerating successfully and surviving to maturity in late and advanced stages of succession. The species is also present in all (or nearly all stands).
c	Minor Climax	As above except species may not occur in all (or most) stands.
S	Major Seral	Species is clearly regenerating successfully and surviving only in early or middle stages of succession, although mature trees often persist as overstory in later stages. The species is present or potential in all (or nearly all) stands.
s	Minor Seral	As above except species may not occur (now or as potential) in all (or most) stands.
a	Acci-dental	The species occurs (either as seral or climax associate) only on special microsites or very infrequently. It will not become more abundant as succession progresses.
	Blank	Species is not found in typical stands.

SHRUBS, HERBS, CRYPTOGAMS. CRYPTOGAMS ARE USUALLY THE MOSSES AND LICHENS CONSIDERED COLLECTIVELY. AN EXPRESSION OF COVERAGE IS FOLLOWED BY LISTING SOME OF THE MORE FREQUENTLY ENCOUNTERED PLANTS. COVERAGE VALUES ARE AS FOLLOWS:

Luxuriant = coverage > 50%, **Abundant** = 25-50%, **Well represented** = 5-25%, **Poorly represented** = < 5%, **Common** = 1-5%, **Scarce** = < 1%.

Percentages are relative to the entire area of a plot or stand.

Diagnostic species are indicated by *.

DIS - DISTRIBUTION OR GEOGRAPHIC RANGE. STATE ABBREVIATIONS ARE: AZ = ARIZONA, NM = NEW MEXICO, CO = COLORADO, UT = UTAH, ID = IDAHO. LOCATIONAL ADJECTIVES INCLUDE s = SOUTHERN, c = CENTRAL, n = NORTHERN, sw = SOUTHWESTERN, ETC. ADMINISTRATIVE ABBREVIATIONS INCLUDE NF = NATIONAL FOREST, RD = RANGER DISTRICT, RES = INDIAN RESERVATION.

ALSO SEE - REFERENCE IS GIVEN TO SIMILAR OR CLOSELY RELATED ASSOCIATIONS.

Format of the Management Implications

H. T. - COMMON NAME OF THE HABITAT TYPE

REGENERATION METHODS - THE GENERAL RECOMMENDATIONS MAY BE MODIFIED BY CONDITIONS OF SOIL OR TOPOGRAPHY.

PLANTING - THE PROBABILITY OF PLANTING SUCCESS IS A SUBJECTIVE ESTIMATE OF PROBABILITY OF ACHIEVING 80% OR HIGHER SURVIVAL OF WELL-PLANTED, HEALTHY SEEDLINGS ON ADEQUATELY PREPARED SITE. FOR SOIL LIMITATIONS TO PLANTING, SEE TES REPORTS.

SITE PREPARATION CODES ARE:

B = USUALLY BENEFICIAL FOR PLANTED CONIFERS,
H = USUALLY DETRIMENTAL TO CHANCES FOR SURVIVAL OF PLANTED OR NATURALLY SEEDED CONIFERS,
A = STRONGLY FAVORS NATURAL REGENERATION OF ASPEN.

FOR SOIL LIMITATIONS ON SITE PREPARATION, SEE TES REPORTS.

REVEGETATION IS A SUBJECTIVE ESTIMATE OF RATE OF REVEGETATION AFTER CLEARING OR CATASTROPHIC DISTURBANCE. FOR EROSION OR SOIL LOSS INDICES, SEE TES REPORTS. SOIL SPECIFIC REFORESTATION POTENTIALS ARE ALSO GIVEN IN TES REPORTS.

STOCKABILITY IS AN ESTIMATE OF THE ABILITY OF THE HABITAT TYPE TO SUPPORT FULL STOCKING OF COMMERCIAL TIMBER SPECIES EXPRESSED AS A DECIMAL FRACTION.

BUDWORM SUSCEPTABILITY IS AN INDEX VALUE FOR USE IN THE WESTERN SPRUCE BUDWORM HAZARD RATING FORMULA.

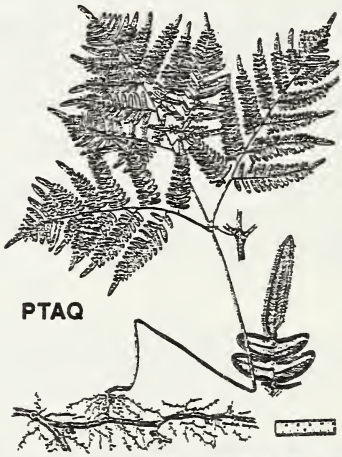
TSI - TIMBER STAND IMPROVEMENT

PRODUCTIVITY TREES ARE ESTIMATED FROM LIMITED SITE INDEX DATA AND CLASSIFIED BY CUBIC FEET/ACRE/YEAR AS HIGH, MODERATE, AND LOW. SITE INDEX IS AN AVERAGE FOR THE SPECIES NOTED PLUS OR MINUS ONE STANDARD DEVIATION. N = NUMBER OF SITE TREES INCLUDED IN THE INDEX. FOR SITE INDEX BY SOIL TYPES, SEE TES REPORTS. MORE DATA IS NEEDED FOR MOST HABITAT TYPES.

FORAGE RATING VALUE FOR CATTLE ARE GIVEN FOR CLEARINGS (EARLY SERAL) AND FOR MATURE FOREST STANDS (LATE SERAL). FOR FORESTS THE RATINGS ARE:

HIGH	> 1500 lbs/acre/yr (average)
MODERATE	500-1500 lbs/ac./yr
LOW	250-500 lbs/ac./yr
NONE	< 250 lbs/ac./yr

FORAGE AND FORAGE MAXIMUM RATINGS FOR SPECIFIC SOILS ARE CONTAINED IN TES REPORTS.



Pteridium aquilinum (bracken fern)

FORESTS

White fir/Kinnikinnik h.t.

Oreochrysum parryi (Parry's goldenweed)

Thalictrum fendleri (Meadow rue)

Acer glabrum (Rocky Mountain maple)

Picea engelmannii/Erigeron eximius 1

Engelman spruce/Forest fleabane 004310
PIEN/EREX

SYN: Picea pungens-P. engelmannii/Erigeron superbus (Moir and Ludwig 1979).

SITE: Gentle to steep slopes, 8,800-10,000 ft.

TES: 7, -1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
a	C	s	S	s	S	s		s				

SHRUBS: Poorly represented. Acer glabrum, Physocarpus monogynus, Rubus parviflorus.

HERBS: Abundant to luxuriant. Bromus ciliatus, Carex foenea, Trisetum montanum, Erigeron eximius, Geranium richardsonii, Lathyrus arizonicus, Thermopsis pinetorum, Viola canadensis.

DIS: C-AZ, sw- and c-NM into n-NM (Jemez Mts.)

ALSO SEE: ABLA/EREX if Abies lasiocarpa has common reproduction and is surviving. ABCO/EREX or ABCO/ACGL if Picea engelmannii is minor as regeneration relative to Abies concolor and Pseudotsuga menziesii in mature stands.

MGT: See ABLA/EREX.

COMMENTS:

Picea engelmannii/Geum rossii

Engelmann spruce/Alpine avens
PIEN/GERO

004330

SITE: 11,000 ft. to timberline; very limited growing season for trees. Upper elevational forest limit coincides with 12 degrees C June isotherm.

TES: 7, +1.

TREES:	ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
	a	C						s					

SHRUBS: Scarce to common. Ribes montigenum, Lonicera involucrata.

HERBS: Well represented. Geum rossii*, Polemonium pulcherrimum, Trisetum spicatum, Aquilegia chrysantha, Festuca brachyphylla, Monesis uniflora.

CRYPTOGAMS: Well represented especially lichens and minute mosses.

DIS: n-AZ (San Francisco Peaks).

ALSO SEE: Picea engelmannii/Ribes montigenum (Youngblood and Mauk 1985) if herbs are poorly represented. PIEN/GERO is distinct from krumholz where Picea engelmannii is shrubbly because of tundra-like climate.

MGT: See PIEN/VAMY/POPU.

Picea engelmannii/Moss 3

Engelmann spruce/Moss 004060
PIEN/Moss

SITE: Summits, ridgetops, dry upper slopes > 10,000 ft.

TES: 7, -1.

TREES:	ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
		C		S		S	S						

SHRUBS: Scarce. Acer glabrum, Lonicera involucrata, Vaccinium myrtillus.

HERBS: Scarce (occasional species to 2-3 percent cover).

CRYPTOGAMS: Well represented on microsites without litter.

DIS: Cibola National Forest (Magdalena Ranger District)-San Mateo Mts. NM. Coronado National Forest (Douglas Ranger District), Chiricahua Mts., AZ, local in n-NM, CO, WY, ID.

ALSO SEE: PIEN/VAMY where Vaccinium myrtillis has cover > 5 percent; ABLA/Moss where Abies lasiocarpa is a major climax tree.

COMMENTS: The absence of Abies lasiocarpa at low elevations is partly due to chance factors of migration and establishment in a "mountain island" setting of the Basin and Range physiographic province.

H. T.: Engelmann spruce/Moss

REGENERATION METHODS:

Clearcut: Is not usually successful, can favor aspen to a limited extent on better sites.

Shelterwood: Is usually successful, favors spruce or sometimes Douglas-fir.

Seed Tree: Not usually successful.

Selection: Is usually successful, favors spruce.

PLANTING:

Recommended Species: Engelmann spruce, Douglas-fir (in San Mateos).

Success Probability: Moderate to poor in large openings.

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	H	H	B
Burning	H	H	H

REVEGETATION: Slow

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 0.6

TSI: Not usually needed.

PRODUCTIVITY:

Site Index (NO DATA) _____ _____ Productivity Low

Resource Value Rating (Cattle): Early Seral None Late Seral None

OTHER: Cold, windswept sites of limited potential for timber and range. Large openings can be very difficult to reforest because of dry, exposed nature of the site.

Picea engelmannii/Vaccinium myrtillus 4

Engelmann spruce/Myrtle huckleberry 004360
PIEN/VAMY

SITE: Upper n- or e-facing slopes, > 10,000 ft.; northerly draws > 9,500 ft.; extremely cobbly soils.

TES: 7, -1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
	C		S	s	S	S						

SHRUBS: Well represented to abundant. Vaccinium myrtillus*, Juniperus communis, Jamesia americana, Lonicera utahensis, Salix scouleriana, Acer glabrum.

HERBS: Poorly represented. Bromus ciliatus, Ramischia secunda, Erigeron eximius.

CRYPTOGAMS: Well represented on microsites without litter.

DIS: Cibola National Forest (Magadalena Ranger District); San Mateo Mts.; local in Jemez Mts (Jemez RD)

ALSO SEE: PIEN/Moss; ABLA/VAMY, LIBO and RUPA phases.

COMMENTS:

H. T.: Engelmann spruce/Myrtle huckleberry

REGENERATION METHODS:

Clearcut: Is usually successful if kept small and planted promptly. Favors aspen if any aspen is in the original stand.

Shelterwood: Is usually successful; heavy cuts sometimes cause blowdown of the residual. Tends to favor Douglas-fir.

Seed Tree: Is not usually successful because of blowdown of the seed trees.

Selection: Is usually successful and favors spruce.

PLANTING:

Recommended Species: Engelmann spruce, Douglas-fir, Southwestern white pine.

Success Probability: High

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	H	B	B
Burning	H,A	H,A	

REVEGETATION: Moderately rapid.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 0.6

TSI: Sometimes is needed to reduce stocking.

PRODUCTIVITY:

Site Index (NO DATA) _____ _____ Productivity L to M

Resource Value Rating (Cattle): Early Seral L Late Seral None

OTHER: Has good potential for water yield and aspen management. Browse production is important for wildlife summer range; browse component increases in seral stages.

Picea engelmannii/Vaccinium myrtillus/Polemonium pulcherrimum

Engelmann spruce/Myrtle huckleberry/Jacobs ladder
PIEN/VAMY/POPU

PIEN phase 004151
ABLA phase 004152

SYN: Picea engelmannii/Vaccinium scoparium/Polemonium delicatum (Moir and Ludwig 1979).

SITE: 10,900 ft. to timberline. Upper limit (at timberline) coincides with the 12 degrees C isotherm in June. Very limited growing season for trees.

TES: 7, +1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
c	C						s					

SHRUBS: Well represented. Vaccinium myrtillus, V. scoparium, Ribes montigenum, Lonicera involucrata.

HERBS: Well represented. Polemonium delicatum*, Senecio amplectens, Ramischia secunda, Monesis uniflora, Sibbaldia procumbens, Penstemon whippleanus.

CRYPTOGAMS: Well represented, including both lichens and mosses.

DIS: N-NM, s-CO.

ALSO SEE: Krummholz refers to a forest-tundra border vegetation characterized by stunted, shrubby stature of Picea engelmannii and Abies lasiocarpa. See also Picea engelmannii/Trifolium dasyphyllum in central CO (Hess and Alexander 1986).

COMMENTS:

H. T.: Engelmann spruce/Myrtle huckelberry-Jacobs ladder

REGENERATION METHODS:

Clearcut: Seldom, if ever successful, favors tundra plants.

Shelterwood: Usually successful if enough time is allowed for seedlings to become established.

Seed Tree: Not usually successful due to blowdown.

Selection: Usually successful.

PLANTING:

Recommended Species: Engelmann spruce.

Success Probability: Low

SITE PREPARATION

Method	INTENSITY High	Moderate	Low
Mechanical	H	H	B
Burning	H	H	H

REVEGETATION: After disturbance, moderate to slow.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 0

TSI: Not usually needed.

PRODUCTIVITY: PIEN

Site Index 52 + 9 _____ _____ Productivity L to M

Resource Value Rating (Cattle): Early Seral Low Late Seral None

OTHER: Can be very important for snow retention especially in ski areas. Very difficult to reforest once cleared or burned. Occupies the forest-alpine tundra ecotone.

Picea engelmannii/Ribes montigenum 6

Engelmann spruce/Mountain gooseberry 004340
PIEN/RIMO

SITE: 10,000 to 11,400 ft., on extremely rocky soils; MAP = 31 in/yr., mean annual air temperature 34 F (1.2 C).

TES: 7, +1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
a	C		s									

SHRUBS: Common. Ribes montigenum.

HERBS: Scarce. For list see PIEN/GERO.

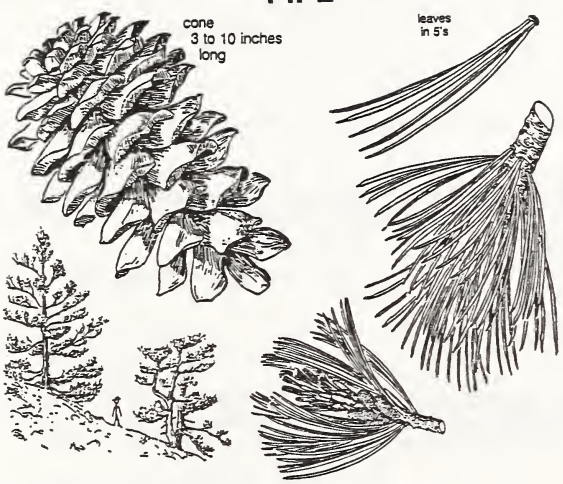
CRYPTOGAMS: Well represented especially lichens on rocks.

DIS: N-NM (San Francisco Peaks) into s-UT.

ALSO SEE: Scree forest; PIEN/GERO if herbs are well represented.

MGT: Soil and climatic limitations generally preclude silviculture. Budworm SUSCEPTIBILITY 0. See Youngblood and Mauk (1985).

PIFL



Pinus flexilis (Limber pine)

Abies lasiocarpa/Erigeron eximius 7

Corkbark fir/Forest fleabane 003080
ABLA/EREX

SYN: Abies lasiocarpa/Erigeron superbus (Moir and Ludwig 1979), ABLA-PIEN1/EREX (Johnston 1984).

SITE: All slopes and aspects 9,400-10,200 ft.; n-slopes as low as 8,900 ft. MAP 29-31 in/yr.; deep winter snowpack.

TES: 7, -1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
C	C	s	S	s	S	s						

SHRUBS: Poorly or well represented. Juniperus communis Rubus parviflorus, Salix scouleriana, Acer glabrum, Lonicera involucrata, Shepherdia canadensis.

HERBS: Luxuriant. Erigeron eximius*, Geranium richardsonii, Smilacina stellata, Osmorhiza depauperata, Artemisia franserioides, Ramischia secunda, Viola canadensis, Bromus ciliatus, Trisetum montanum, Carex foenea.

CRYPTOGAMS: Well represented.

DIS: c-AZ, sw-NM into s-CO.

ALSO SEE: ABLA/LAAR, PIEN/EREX, and ABLA/ACGL (Alexander et al 1987, Youngblood and Mauk 1985), the latter on sites with shrubs well represented.

COMMENTS:

H. T.: Corkbark fir/Forest fleabane

REGENERATION METHODS:

Clearcut: Favors aspen; favors spruce over fir.

Shelterwood: Heavy shelter favors fir, less shelter favors spruce.

Seed Tree: Not usually successful due to blowdown.

Selection: Favors fir over spruce and aspen.

PLANTING:

Recommended Species: Engelmann spruce, Douglas-fir, corkbark fir.

Success Probability: High

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	H	B	B
Burning	H,A	H,A	

REVEGETATION: Rapid

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 1.5

TSI: Can be used to improve species composition.

PRODUCTIVITY: 20 [/\ ] 100

Site Index $\frac{82 + ?}{PSME}$ $\frac{64 + 16}{PIEN}$ _____ N = 89

Resource Value Rating (Cattle): Early Seral H Late Seral M-L

OTHER: Good potential for aspen management; important for snow retention.

Abies lasiocarpa/Juniperus communis 8

Subalpine fir/Common juniper 003090
ABLA/JUCO

SYN: Abies asiocarpa-Picea engelmannii/Juniperus communis (Johnston 1984).

SITE: N- or e-facing draws and gentle to moderate slopes, 8,700-9,200 ft. MAP 29 in/yr.; moderate snowpack, little precipitation in May and June.

TES: 7, -1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
C	C		S	s	S			a				

SHRUBS: Common. Juniperus communis, Berberis repens, Robinia neomexicana, Lonicera utahensis.

HERBS: Usually common. Carex foenea, C. rossii, Fragaria ovalis, Ramischia secunda, Erigeron eximius, Bromus ciliatus.

DIS: N-AZ (North Kaibab Plateau) into UT, ID, WY; perhaps local in n-NM.

ALSO SEE: Youngblood and Mauk (1985) describe ABLA/JUCO in s- and c-UT; ABLA/MOSS.

COMMENTS:

H. T.: Subalpine fir/Common juniper

REGENERATION METHODS:

Clearcut: Often successful if small. Larger openings, usually need prompt planting.

Shelterwood: Usually successful.

Seed Tree: Not usually successful due to blowdown.

Selection: Usually successful, favors fir over spruce.

PLANTING:

Recommended Species: Engelmann spruce, Douglas-fir.

Success Probability: Moderate to low due to cold, dry conditions.

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	H	B	B
Burning	H	H	H

REVEGETATION:

STOCKABILITY: 1.0 BUDWORM SUSCEPTIBILITY: 1.5

TSI: Ocassionally needed.

PRODUCTIVITY:

Site Index ___?___ _____ _____ Productivity L to M

Resource Value Rating (Cattle): Early Seral Moderate Late Seral None

OTHER: Common juniper can provide good cover for ground nesting birds.

Abies lasiocarpa/Lathyrus arizonicus 9

Corkbark fir/Arizona peavine 001070
ABLA/LAAR

SITE: 9,400-10,000 ft., elevation on deep, well-watered soils; moderate snowpack.

TES: 7, 0.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
C	C		S									

SHRUBS: Scarce.

HERBS: Luxuriant. Lathyrus arizonicus, L. leucanthus, Vicia americana, Oreochrysum parryi, Pteridium aquilinum, Smilacina stellata, Geranium richardsonii, Carex foenea, Carex geyeri, Bromus ciliatus.

DIS: N-AZ and n-NM, local in sw-NM.

ALSO SEE: Abies lasiocarpa/Carex geyeri in CO and UT (Youngblood and Mauk 1985; Rominger and Paulik (1983) for description in San Francisco Peaks, AZ. This h.t. is closely related to ABLA/EREX.

COMMENTS:

H. T.: Subalpine fir/Arizona peavine

REGENERATION METHODS:

Clearcut: Usually successful, favors aspen strongly.

Shelterwood: Usually successful, favors spruce and fir.

Seed Tree: Not usually successful.

Selection: Usually successful, favors fir over other species.

PLANTING:

Recommended Species: Engelmann spruce.

Success Probability: High

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	H	B	B
Burning	A	A	A

REVEGETATION:

STOCKABILITY: 1.0 BUDWORM SUSCEPTIBILITY: .8

TSI: Sometimes needed.

PRODUCTIVITY:

Site Index ____?_____ _____ _____ Productivity High

Resource Value Rating (Cattle): Early Seral High Late Seral Low

OTHER: Important for water yield and summer range for big game; tall aspen can have scenic value.

Abies lasiocarpa/Mertensia ciliata

Subalpine fir/bluebells
ABLA/MECI

003060

SYN: Abies lasiocarpa-Picea engelmannii/Mertensia ciliata (Johnston 1984).

SITE: Moderate to steep slopes, 10,000 ft. to timberline; seeps and saturated soils.

TES: 7, 0, +1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
C	C											

SHRUBS: Absent except on hummocks where Vaccinium or Ribes can occur.

HERBS: Luxuriant. Mertensia ciliata, Oxypolis fendleri, Cardamine cordifolia, Caltha leptosepala, Saxifraga odontoloma, Senecio triangularis.

DIS: n-NM into CO.

ALSO SEE:

COMMENTS: Stands near timberline may have little Abies lasiocarpa.

H.T.: Subalpine fir/bluebells

REGENERATION METHODS:

Clearcut: Favors herbs.

Shelterwood: Sometimes successful, heavy cuts often blowdown.

Seed Tree: Not recommended due to blowdown.

Selection: Usually successful if cutting is light.

PLANTING:

Recommended Species: Engelmann spruce.

Success Probability: Low

SITE PREPARATION:

METHOD	INTENSITY: HIGH	MODERATE	LOW
Mechanical	H	H	
Burning	N/A	N/A	N/A

REVEGETATION: After disturbance, rapid due to lush regrowth of sedges, grasses and tall forbs.

STOCKABILITY: 1 BUDWOARM SUSCEPTIBILITY: 0.6

TSI: Not usually needed.

PRODUCTIVITY: PIEN

Site Index 62 + 14 _____ _____ Productivity Moderate

Forage Value Rating (Cattle): Early Seral High Late Seral None

OTHER: Very wet; operation of heavy equipment is impossible or very damaging to site. If tree removal is necessary cable yarding should be used. Very difficult to regenerate once cleared or burned. Important for elk wallows, natural water sources.

Abies lasiocarpa/Moss

Corkbark (subalpine) fir/Moss
ABLA/MOSS

003110

SYN: Abies lasiocarpa-Picea engelmannii/Moss (Johnston 1984).

SITE: Summits, ridgetops, upper slopes 9,800-11,500 ft.; cold, dry sites.

TES: 7, 0.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
C	C		s		s		s					

SHRUBS: Scarce to common. Juniperus communis, Ribes montigenum, Vaccinium spp., Acer glabrum (lower elevations).

HERBS: Scarce.

CRYPTOGAMS: Well represented on microsites without litter.

DIS: NM, AZ, s-CO.

ALSO SEE: At lower elevations ABLA/JUCO has common herbs, and Pseudotsuga is a more important seral tree. At higher elevations or more exposed sites where Abies lasiocarpa becomes a minor tree, see PIEN/MOSS.

COMMENTS:

H.T.: Subalpine fir/moss

REGENERATION METHODS:

Clearcut: May favor aspen if present, otherwise not usually successful unless promptly planted.

Shelterwood: Usually successful, favors Engelmann spruce.

Seed Tree: Not usually successful.

Selection: Favors subalpine fir.

PLANTING:

Recommended Species: Engelmann spruce.

Success Probability: Moderate

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	H	H	B
Burning	H	H	

REVEGETATION: After disturbance moderate.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 0

TSI:

PRODUCTIVITY: PIEN

Site Index 54 + 11 _____ _____ Productivity Low to moderate

Forage Value Rating (Cattle): Early Seral Moderate Late Seral None

OTHER: Dry habitat type occurs typically near ridges and upper slopes. Poor site for aspen.

Abies lasiocarpa/Rubus parviflorus 12

Corkbark fir/Thimbleberry 003240
ABLA/RUPA

SYN: ABLA-PIEN1/RUPA (Johnston 1984).

SITE: Mid and lower slopes and draws 8,800-9,200 ft. (but as low as 8,200 ft. in sheltered draws). Soils often extremely cobbly.

TES: 7, -1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
C	c		S	s	S	a						

SHRUBS: Abundant. Acer glabrum, Rubus parviflorus*, Holodiscus dumosus, Salix scouleriana, Robinia neomexicana, Lonicera utahensis.

HERBS: Well represented (sometimes abundant). Geranium richardsonii, Bromus ciliatus, Pteridium aquilinum, Smilacina racemosa, Senecio cardamine, Osmorhiza depauperata, Actaea rubra, Ramischia secunda.

DIS: Gila NF (Wilderness RD) - local in Mogollon Mts., NM; also n-NM, s-CO (DeVelice et al 1986).

ALSO SEE: ABLA/ACGL (Alexander et al 1987, Youngblood and Mauk 1985).

COMMENTS:

H. T.: Corkbark fir/Thimbleberry

REGENERATION METHODS:

Clearcut: Favors spruce over fir, favors aspen.

Shelterwood: Heavy shelter favors fir, less shelter favors Douglas-fir and spruce.

Seed Tree: Not usually successful because of blowdown.

Selection: Favors fir.

PLANTING:

Recommended Species: Engelmann spruce, Douglas-fir.

Success Probability: High

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	H	B	B
Burning	H	H	

REVEGETATION: Moderate to rapid.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 0.8

TSI: Sometimes needed to improve species composition.

PRODUCTIVITY: 20 [/\ ] 100

Site Index 67 + 7 (PSME) 55 + 12 (PIEN) _____ N = 14

Resource Value Rating (Cattle): Early Seral Moderate Late Seral None

OTHER: Important for snow retention; important big game feeding and cover.

Abies lasiocarpa/Vaccinium myrtillus

Typic phase 003200
LIBO phase 003201
RUPA phase 003202

Corkbark fir/Myrtle huckleberry
ABLA/VAMY

SYN: ABLA-PIEN1/VAMY (Johnston 1984); ABLA/VASC (Moir and Ludwig 1979).

SITE: All slopes and aspects > 10,000 ft.; n-facing slopes to 9,500 ft. MAP 30-35 in/yr.; heavy winter snowpack.

TES: 7, 0 (Typic phase); 7, -1 (RUPA and LIBO phases).

TREES: (by phase)

	ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
Typic phase	C	C		S		a	a						
RUPA and LIBO phases	C	C		S	s	S	s						

SHRUBS: Well represented to luxuriant. Vaccinium myrtillus*, Lonicera involucrata, L. utahensis, Ribes wolfii, R. montigenum, Sorbus dumosa, Pachistima myrsinites. The RUPA phase includes Acer glabrum, Rubus parviflorus*.

HERBS: Common to well represented. Bromus ciliatus, Trisetum montanum, Erigeron eximius, Ramischia secunda, Epilobium angustifolium,, Pedicularis racemosa, Oreochrysum parryi, Linnaea borealis (LIBO phase).

CRYPTOGAMS: Abundant to luxuriant, especially mosses.

DIS: Apache NF, Fort Apache Res. - White Mts. AZ;
Gila NF - Mogollon Mts., Black Range;
Coronado NF (Safford RD)-Pinaleno Mts. (southern distribution in U.S.); also n-NM, s-CO, s-UT (LaSal Mts.).

ALSO SEE: ABLA-PIEN1/VASC (Johnston 1984) is closely related but has Pinus contorta as a major seral tree; ABLA/VAMY-RUPA of DeVelice et al (1986) appears identical to the RUPA phase, and their ABLA/VAMY-LIBO h.t. is identical to the LIBO phase.

COMMENTS:

H. T.: Corkbark fir/Myrtle huckleberry

REGENERATION METHODS:

Clearcut: Favors spruce over fir.

Shelterwood: Heavy shelter favors fir, less shelter favors spruce.

Seed Tree: Often unsuccessful because of blowdown.

Selection: Favors fir.

PLANTING:

Recommended Species: Engelmann spruce, corkbark fir.

Success Probability: High

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	H		B
Burning	H	H	H

REVEGETATION: Slow to moderate due to short growing season.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 0.6 (Typic)
0.8 (RUPA, LIBO)

TSI: Sometimes needed to reduce stocking and improve species composition.

PRODUCTIVITY: 20 [/\ ] 100

Site Index 57 + 12 (PIEN) _____ _____ N = 98

Resource Value Rating (Cattle): Early Seral Low Late Seral None

OTHER: Important for snow retention. RUPA and LIBO phases tend to be more productive than typic phase.

Picea pungens/Arctostaphylos uva-ursi

Blue spruce/Kinnikinnik
PIPU/ARUV

006080

SYN: Picea pungens-Pseudotsuga menziesii h.t. (Moir and Ludwig 1979); Picea pungens-Pseudotsuga menziesii/Arctostaphylos uva-ursi (Johnston 1984).

SITE: Ridges, benches, or slopes within cold air drainages and often s or w aspects, 8,000-9,100 ft.

TES: 6, 0.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
a		C	S	C	C			s				

SHRUBS: Abundant. Arctostaphylos uva-ursi, Juniperus communis, Pachistima myrsinites, Berberis repens, Amelanchier alnifolia, Rosa spp., Symphoricarpos oreophilus.

HERBS: Common to well represented. Fragaria ovalis, F. americana, Smilacina stellata, Achillea millefolium, Festuca arizonica, Muhlenbergia montana, Koeleria macrantha.

DIS: Local in n-NM, s-CO.

ALSO SEE: Picea pungens/Juniperus communis in UT (Youngblood and Mauk 1985) appears similar. PIPU/FEAR occupies drier, warmer sites. PIPU/CAFO differs primarily by scarcity of Arctostsaphylos uva-ursi

COMMENTS:

H. T.: Blue spruce/Kinnikinnik

REGENERATION METHODS:

Clearcut: Often successful, can favor ponderosa pine, Douglas-fir, and aspen.

Shelterwood: Usually successful, heavy cuts favor ponderosa pine and Douglas-fir, light cuts favor white fir and blue spruce.

Seed Tree: Sometimes successful.

Selection: Favors blue spruce and white fir.

PLANTING:

Recommended Species: Ponderosa pine, Douglas-fir, and Blue spruce.

Success Probability: High

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	H	B	B
Burning		B	

REVEGETATION: After disturbance, moderately rapid.

STOCKABILITY: BUDWORM SUSCEPTIBILITY: 1.5

TSI: Sometimes useful to improve species composition and reduce budworm susceptibility.

PRODUCTIVITY: PSME

Site Index 61 + ? _____ _____ Productivity Moderate

Resource Value Rating (Cattle): Early Seral low Late Seral none

OTHER: Attractive habitat type with a variety of tree species. Relatively dry for a blue spruce habitat type, good site for Douglas-fir. Provides good selection of options for wildlife habitat diversity.

Picea pungens/Carex foenea

Blue spruce/Fony sedge
PIPU/CAFO

006060

SYN:

SITE: Lower slopes and drainages, streamsides, and forest borders of grassy parks, 8,600-9,100 ft.; frost pockets or cold air drainages.

TES: 6, 0.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIST	PIPO	QUGA	PIED	JUSC	JUMO	JUDE
		C	S	c	C	s	S					

SHRUBS: Scarce to well represented. Juniperus communis, Pachistima myrsinites, Lonicera arizonica, Quercus gambelii, Holodiscus dumosus.

HERBS: Abundant (sometimes luxuriant). Carex foenea, Bromus ciliatus, Muhlenbergia montana, Erigeron spp., Fragaria americana, F. ovalis, Lathyrus arizonicus, Oreochrysum parryi, Thalictrum fendleri, Senecio wootoni, Galium spp., Poa pratensis.

DIS: NM, AZ, and s-CO.

ALSO SEE: PIPU/FROV (Alexander et al 1984); PIPU/ARUV.

COMMENTS:

H. T.: Blue spruce/Fony sedge

REGENERATION METHODS:

Clearcut: Favors aspen. Can favor ponderosa pine or Douglas-fir if planted promptly.

Shelterwood: Heavy shelter favors blue spruce and white fir; lighter shelter favors ponderosa pine and Douglas-fir. Blowdown may be a problem on poorly drained soils. Favors aspen.

Seed Tree: Blowdown of seed trees may be a problem.

Selection: Favors white fir or blue spruce.

PLANTING:

Recommended Species: Ponderosa pine, Douglas-fir, blue spruce, white fir.

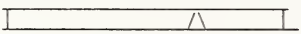
Success Probability: High. Be careful on poorly aerated, clayey soils.

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical		B	B
Burning	A	B	B

REVEGETATION: Rapid.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 1.0

TSI: Sometimes needed to reduce stocking and increase proportion of ponderosa pine.

PRODUCTIVITY: 20  100

Site Index 73 + ? (PIPO) 89 + ? (PSME) _____ N = 3

Forage Volue Rating (Cattle): Early Seral High Late Seral Low

OTHER: High visual quality with pleasing arrangement of tall, large-diameter pine mixed with aspen and blue spruce. Good potential for producing contrasting stands adjacent to one another.

Picea pungens/Cornus stolonifera

Blue spruce/Red ozier dogwood 006010
PIPU/COST

SYN: Picea pungens/Amelanchier alnifolia-Swida sericea (Johnston 1984)
Picea pungens/Poa pratensis (Moir and Ludwig 1979).

SITE: Streamsides and well-watered tributary draws, 8,000-9,100 ft., often forming mosaics with valley bottom meadows.

TES: 6, -1, 0, +1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	POAN
	a	C	S	a	S	a		a		s		s

SHRUBS: Well represented to luxuriant. Cornus stolonifera, Amelanchier alnifolia, Alnus tenuifolia, Prunus virginiana, Symphoricarpos oreophilus, Salix scouleriana, Salix bebbiana, Acer glabrum, Lonicera involucrata.

HERBS: Abundant. Poa pratensis, Calamagrostis canadensis, Carex foenea, Carex spp., Geranium richardsonii, Osmorhiza depauperata, Taraxacum officinale, Smilacina spp., Thalictrum fendleri, Heracleum sphondylium, Geum allepicum.

DIS: NM, AZ, s-CO.

ALSO SEE: Picea pungens/Swida sericea (DeVelice et al 1986); riparian forests. The PIPU/POPR forest described by Moir and Ludwig (1979) is probably a derived community type (from grazing and browsing).

COMMENTS:

H. T.: Blue spruce/Red ozier dogwood

REGENERATION METHODS:

Clearcut: May result in conversion to bluegrass meadow, favors aspen if protected from livestock.

Shelterwood: Usually successful, but may suffer blowdown on poorly drained sites.

Seed Tree: Often results in conversion to bluegrass meadow, and may suffer blowdown.

Selection: Favors spruce; usually the best method on riparian pastures.

PLANTING:

Recommended Species: Blue spruce, Douglas-fir.

Success Probability: Moderate, sites subject to frost action.

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical		B	
Burning	H		

REVEGETATION: Very rapid.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 0.8

TSI: Usually unnecessary.

PRODUCTIVITY:

Site Index ____+____ ____+____ ____+____ Productivity Moderate

Forage Value Rating (Cattle): Early Seral ____H____ Late Seral ____M____

OTHER: Prime recreational, visual, wildlife, and livestock habitat. Tree regeneration can be eliminated by wildlife or livestock use after clearing or fire. Periodic flooding may bring about tree and meadow mosaics.

Picea pungens/Erigeron eximus

Blue spruce/Forest fleabane — Typic phase 006070
PIPU/EREX — PIPO phase 006071

SYN: Picea pungens-Pseudotsuga menziesii h.t., Valeriana acutiloba phase (Moir and Ludwig 1979); PIPU-PSME/EREX (Johnston 1984).

SITE: Gentle slopes and plateau summits, 9,000-9,400 ft.; moderate and steep n-slopes adjoining canyon bottom drainages > 8,000 ft.; cold air drainages and frost pockets.

TES: 7, -1 (typic phase); 6, +1 (PIPO phase).

TREES: (by phase)

	ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
Typic phase		c	C	S	s	C	s						
Pinus ponderosa phase			C	S	c	C	s		s				

SHRUBS: Well represented. Acer glabrum, Quercus gambelii, Amelanchier alnifolia, Lonicera arizonica, Pachistima myrsinites, Juniperus communis, Rosa arizonica.

HERBS: Abundant to luxuriant. Erigeron eximius, E. formosissimus, Thalictrum fendleri, Fragaria americana, F. ovalis, Geranium richardsonii, Artemisia franserioides, Viola canadensis, Smilacina spp., Valeriana capitata, Bromus ciliatus, Poa fendleriana, Koeleria macrantha, Carex spp.

CRYPTOGAMS: Abundant.

DIS: NM, AZ, s-CO.

ALSO SEE: PIEN/EREX where Picea pungens can be seral.

COMMENTS:

Rhus trilobata (skunkbush sumac)

Picea pungens/Festuca arizonica

Blue spruce/Arizona fescue
PIPU/FEAR

006080

SYN:

SITE: Gentle to steep, s- to w-slopes, 8,200-9,200 ft., in frost pockets or cold air drainages, often adjoining meadows.

TES: 6, -1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
		C	s	c	C	s		S				

SHRUBS: Scarce. Ribes cereum, R. pinetorum.

HERBS: Well represented or abundant. Festuca arizonica*, Muhlenbergia montana, Carex foenea, C. rossii, Danthonia parryi, Koeleria macrantha, Sitanion hystrix, Erigeron formosissimus, Potentilla hippiana, Fragaria spp., Lathyrus spp., Muhlenbergia virescens.

DIS: NM, c- and n-AZ, s-CO.

ALSO SEE:

COMMENTS:

H. T.: Blue spruce/Arizona fescue

REGENERATION METHODS:

Clearcut: Sometimes successful, can favor aspen or ponderosa pine. Clearcuts should be planted promptly to avoid grass competition.

Shelterwood: Usually successful, favors spruce and Douglas-fir.

Seed Tree: Sometimes successful, favors ponderosa pine.

Selection: Favors spurce.

PLANTING:

Recommended Species: Ponderosa pine, Douglas-fir, blue spruce.

Success Probability: High

SITE PREPARATION

Method	INTENSITY High	Moderate	Low
Mechanical	B	B	B
Burning	B	B	B

REVEGETATION: Usually rapid.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 1.0

TSI: Sometimes needed to reduce stocking and increase proportion of ponderosa pine.

PRODUCTIVITY: 20 ___/_____ 100

Site Index _____ _____ 48 + ? / PSME N = 4

Forage Value Rating (Cattle): Early Seral H Late Seral L

OTHER: High visual quality when adjoining meadows or roads (diversity of trees); usually relatively poor site for aspen. Moderate site for ponderosa pine (better than limited data for Douglas-fir suggests).

Picea pungens/Linnaea borealis

Blue spruce/Twinflower
PIPU/LIBO

006040

SYN: Picea pungens-Pseudotsuga menziesii/Linnaea borealis (Johnston 1984).

SITE: Lower n-facing slopes, 8,200-9,200 ft. along cold air drainages.

TES: 7, -1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
c	c	C	S	s	S	s		a				

SHRUBS: Well represented. Juniperus communis, Pachistima myrsinites, Rubus parviflorus, Vaccinium myrtillus, Symphoricarpos oreophilus.

HERBS: Abundant to luxuriant. Linnaea borealis*, Ramischia secunda, Thalictrum fendleri, Geranium richardsonii, Erigeron eximius, Fragaria spp., Bromus ciliatus, Oryzopsis asperifolia, Carex foenea, Trisetum montanum.

CRYPTOGAMS: Abundant, especially mosses and the nitrogen-fixing lichen, Parmelia aphthosa.

DIS: Local in n-NM, s-CO.

ALSO SEE: PIPU/EREX is similar but does not contain as rich a component of low, evergreen shrubs and herbs.

COMMENTS:

H. T.: Blue spruce/Forest fleabane

REGENERATION METHODS:

Clearcut: Favors aspen; conifer regeneration sometimes susceptible to frost damage.

Shelterwood: Usually successful; heavy shelter favors spruce, lighter shelter favors Douglas-fir.

Seed Tree: Sometimes successful.

Selection: Favors spruce and white fir.

PLANTING:

Recommended Species: Blue spruce, Douglas-fir.

Success Probability: High

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	H	B	B
Burning	A	A	

REVEGETATION: Usually rapid.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 1.5

TSI: Sometimes needed to reduce stocking and reduce proportion of white fir.

PRODUCTIVITY: 20 ___/___ 100

Site Index $\frac{63 + 10}{PSME}$ _____ _____ N = 10

Forage Value Rating (Cattle): Early Seral M Late Seral L

OTHER: High visual quality along meadow borders and roads; good potential for thermal and hiding cover; good possibilities for aspen management.

Pinus flexilis/Arctostaphylos uva-ursi

Limber pine/Kinnikinnik
PIFL/ARUV

240300

SYN: Pinus flexilis/Juniperus communis (Johnston 1984, Hess and Alexander 1986).

SITE: Upper slopes and ridgetops, 9,500-10,000 ft., high insolation and evapotranspiration.

TES: 7, -1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
	c		S		C	C		a				

SHRUBS: Well represented or abundant. Arctostaphylos uva-ursi*, Juniperus communis.

HERBS: Poorly represented. Carex rossii, Koeleria macrantha, Solidago spp., Oreochrysum parryi.

CRYPTOGAMS:

DIS: n-NM to CO and WY.

ALSO SEE: Climatic data at station C-1 in Marr (1961) and subsequent records from Inst. Arctic and Alpine Res., Univ. Colorado, Boulder.

COMMENTS: In this h.t. Pinus flexilis resembles its northern populations and is distinct from Pinus strobiformis.

H. T.: Limber pine/Kinnikinnik

REGENERATION METHODS:

Clearcut: Not usually successful.

Shelterwood: Usually successful.

Seed Tree: Not usually successful.

Selection: Usually successful.

PLANTING:

Recommended Species: Douglas-fir, Limber pine.

Success Probability: Moderate

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	H	B	B
Burning	H		

REVEGETATION: After disturbance, very slow.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 1.1

TSI: Not usually needed.

PRODUCTIVITY:

Site Index ? + ____ + ____ + Productivity Low

Resource Value Rating (Cattle): Early Seral None Late Seral None

OTHER: Cool dry habitat type. One of the few sites where Limber pine can dominate and thus is important for diversity of wildlife habitats.

Abies concolor/Acer glabrum

White fir/Rocky Mountain maple 001010
ABCO/ACGL

SYN: Abies concolor-Pseudotsuga menziesii/Acer glabrum (Johnston 1984).

SITE: Often n- or e-slopes, 9,000-9,800 ft., (as low as 8,500 ft. along drainages); MAP 29 in/yr.

TES: 6, +1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	QUGA	PIPO	PIED	JUSC	JUMO	JUDE
	a		S	C	C	s		a				

SHRUBS: Well represented or abundant. Acer glabrum*, Salix scouleriana, Amelanchier alnifolia, Holodiscus dumosus, Quercus gambelii, Physocarpus monogynus, Pachistima myrsinites, Symphoricarpos oreophila, Lonicera arizonica, Berberis repens, Robinia neomexicana, Jamesia americana.

HERBS: Well represented. Bromus ciliatus, Artemisia franserioides, Viola canadensis, Oreochrysum parryi, Thalictrum fendleri, Fragaria americana, Osmorhiza depauperata, Geranium richardsonii, Lathyrus arizonicus, Smilacina racemosa, Disporum trachycarpum.

CRYPTOGAMS:

DIS: Widespread throughout mountains of the Southwest.

ALSO SEE: ABCO/EREX has a luxuriant herbaceous understory.

COMMENTS: Abies concolor is occasionally absent in some isolated mountain ranges by accident of dispersal and migration.

H. T.: White fir/Rocky Mountain maple

REGENERATION METHODS:

Clearcut: Favors aspen and maple.

Shelterwood: Is usually successful.

Seed Tree: Sometimes successful, can favor Douglas-fir if seed trees are Douglas-fir.

Selection: Favors white fir.

PLANTING:

Recommended Species: Douglas-fir.

Success Probability: High

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	B	B	B
Burning	A	A	

REVEGETATION: Rapid due to sprouting.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 1.7

TSI: Sometimes needed to reduce white fir and budworm susceptibility.

PRODUCTIVITY: 20 ___/_____ 100

Site Index 61 + _____ _____ _____ N = 24
PSME

Forage Value Rating (Cattle): Early Seral H Late Seral L

OTHER: Maple component lends high visual quality in autumn. Good potential for aspen management. Excellent browse and hiding cover for wildlife (especially deer, elk, black bear).

Abies concolor/Arctostaphylos uva-ursi

White fir/Kinnikinnik
ABCO/ARUV

001090

SYN: Abies concolor-Pseudotsuga menziesii/Arctostaphylos uva-ursi (Johnston 1984).

SITE: Upper slopes and ridgetops, 7,900-9,500 ft.

TES: 6, 0.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
			s	C	C	s		S				

SHRUBS: Abundant. Arctostaphylos uva-ursi*, Pachistima myrsinites, Juniperus communis, Shepherdia canadensis, Rosa sp., Quercus gambelii (<5% cover), Berberis repens.

HERBS: Scarce or common. Poa fendleriana, Carex rossii, Koeleria macrantha, Muhlenbergia montana, Fragaria ovalis, Oreochrysum parryi, Solidago sparsiflora.

CRYPTOGAMS:

DIS: n-NM, s-CO.

ALSO SEE:

COMMENTS:

H. T.: White fir/Kinnikinnik

REGENERATION METHODS:

Clearcut: Often successful, favors ponderosa pine and Douglas-fir, planting often needed.

Shelterwood: Usually successful, heavier cuts favor ponderosa pine and Douglas-fir.

Seed Tree: Often successful.

Selection: Favors white fir.

PLANTING:

Recommended Species: Ponderosa pine, Douglas-fir.

Success Probability: High

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical		B	B
Burning	B	B	

REVEGETATION: After disturbance, usually rapid.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 1.5

TSI: Can be used to reduce budworm susceptibility by reducing white fir component.

PRODUCTIVITY:

	PSME	PIPO		
Site Index	57 + 10	54 + 11	+	Productivity Moderate

Forage Value Rating (Cattle): Early Seral Moderate Late Seral None

OTHER: Common juniper is often present in the understory and can provide very good nesting habitat for turkeys. Berries from kinnikinnik provide a food source. Can be important winter range in open winters.

Abies concolor/Berberis repens

White fir/Oregon grape
ABCO/BERE

001020

SYN: Abies concolor-Pseudotsuga menziesii/(sparse understory) (Moir and Ludwig 1979), ABCO-PSME/sparse (Johnston 1984), ABCO/sparse (DeVelice et al 1986).

SITE: Numerous slopes, aspects, and landforms 8,500-9,500 ft.; MAP 27-28 in/yr.

TES: 6, 0.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIST	PIPO	QUGA	PIED	JUSC	JUDE	JUMO
a	a		S	C	C	S	s					

NO SHRUB OR HERB SPECIES IS DIAGNOSTIC OR INDICATIVE OF THIS HABITAT TYPE.

SHRUBS: Common or well represented. Quercus gambelii, Robinia neomexicana, Symphoricarpos oreophilus, Berberis repens, Holodiscus dumosus, Lonicera spp., Pachistima myrsinites, Rubus parviflorus, Sambucus spp.

HERBS: Scarce (occasional species may reach 2-3 percent cover). Oreochrysum parryi, Thalictrum fendleri, Pteridium aquilinum, Carex rossii, Fragaria spp., Bromus ciliatus, Poa fendleriana, Smilacina spp.

Sparseness of herbs in mature stands is diagnostic.

CRYPTOGAMS:

DIS: Widespread throughout NM, CO, AZ, UT.

ALSO SEE: ABCO-PSME/SYORI (Johnston 1984); Abies concolor/Symphoricarpos oreophilus h.t. (Youngblood and Mauk 1985). If Quercus gambelii attains > 5 percent cover and shade tolerant herbs are well represented, then see ABCO/QUGA.

COMMENTS: Seral stages may be difficult to assign to this h.t. because shrubs and herbs can be well represented or abundant.

H. T.: White fir/Oregon grape; White fir/sparse

REGENERATION METHODS:

Clearcut: May be needed in mistletoe infected stands and usually successful if followed by planting.

Shelterwood: Usually successful; heavy shelter favors white fir over other conifers.

Seed Tree: Sometimes successful if seed trees are Douglas-fir or ponderosa pine.

Selection: Favors white fir.

PLANTING: Dougals-fir, Southwestern white pine, ponderosa pine.

Recommended Species:

Success Probability: Moderate to high.

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	H	B	
Burning	H	B	

REVEGETATION: Moderate to slow due to dryness or nutrient restrictions; Aspen is usually short-lived.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 1.7

TSI: Sometimes needed.

PRODUCTIVITY: 20 _____/_____ 100

Site Index 71 + 10 (PIPO) 67 + 12 (PSME) _____ N = 67

Resource Value Rating (Cattle): Early Seral M-H Late Seral None

OTHER: Poor site quality for aspen; early seral stages are productive for wildlife forage. Some common seral shrubs include Sambucus, Rubus strigosus, Ribes spp., Symphoricarpos oreophilus, Robinia neomexicana, Holodiscus dumosus, Quercus gambelii. Herbs also respond well.

Abies concolor/Erigeron eximius

White fir/Forest fleabane 001030
ABCO/EREX

SYN: Abies concolor-Pseudotsuga menziesii/Erigeron eximius (Johnston 1984).

SITE: Numerous slopes, aspects, and landforms between 8,700-9,700 ft.; MAP 29 in/yr.

TES: 6, +1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUDE	JUMO
	a		S	C	C	s		a				

SHRUBS: Scarce to abundant. Acer glabrum, Salix scouleriana, Holodiscus dumosus, Quercus gambelii, Ribes pinetorum, Lonicera arizonica, Pachistima myrsinites, Robinia neomexicana, Symphoricarpos oreophila.

HERBS: Luxuriant. Erigeron eximius, Oreochrysum parryi, Lathyrus spp., Geranium richardsonii, Valeriana capitata, Fragaria ovalis, Artemisia franserioides, Viola canadensis, Bromus ciliatus, Trisetum montanum, Carex foenea, Actaea rubra, Osmorhiza depauperata.

CRYPTOGAMS:

DIS: Local in forests of AZ and s-UT; widespread in NM and s-CO.

ALSO SEE: ABCO/ACGL is very similar, but has less herb cover, and may indicate more cobbly or stony soils. ABCO/RONE, CAFO phase usually does not have luxuriant herbs and often occurs on soils with high content of volcanic ash. ABCO/LAAR is similar but has a rich legume component (e.g. Lathyrus spp.) and greater importance of ponderosa pine as a seral tree.

COMMENTS:

H. T.: White fir/Forest fleabane

REGENERATION METHODS:

Clearcut: Favors aspen and to lesser extent, Douglas-fir. Usually needs planting to assure conifer regeneration.

Shelterwood: Usually successful.

Seed Tree: Sometimes successful if Douglas-fir are seed trees.

Selection: Favors white fir.

PLANTING:

Recommended Species: Douglas-fir, Southwestern white pine, white fir.

Success Probability: High

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	H	B	B
Burning	A	A	

REVEGETATION: Rapid, strong herb and shrub response.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 1.7

TSI: Sometimes needed to reduce proportion of white fir and to reduce budworm susceptibility.

PRODUCTIVITY: 20 ____/_____ 100

Site Index $\frac{72 + 9}{\text{PSME}}$ _____ _____ N = 28

Forage Value Rating (Cattle): Early Seral H Late Seral M

OTHER: Good wildlife food and cover. Good potential for aspen management. Luxuriant understories have high visual appeal in mature stands along roads or bordering meadows.

Abies concolor/Festuca arizonica

White fir/Arizona fescue
ABCO/FEAR

FEAR phase 011040
POFE phase 001041
QUGA phase 001042

SYN: Abies concolor-Pseudotsuga menziesii/Festuca arizonica (Johnston 1984).

SITE: Many slopes and aspects 8,200-9,500 ft.; MAP 26-28 in/yr., dry season May-June, high evaporation.

TES: 6, 0.

TREES: (by phase)

	ABLA	PIEN	PIPU*	POTR	ABCO	PSME	PIST	PIPO	QUGA	PIED	JUSC	JUDE	JUMO
FEAR & POFE			c	s	C	C	s	S					
QUGA			c	s	C	C	s	S	s				

*PIPU on sites adjoining cold air drainage.

SHRUBS: Scarce. Quercus gambelii, Holodiscus dumosus, Ribes pinetorum, Pachistima myrsinites, Robinia neomexicana.

HERBS: Abundant. Festuca arizonica*, Muhlenbergia montana, Danthonia parryi, Poa fendleriana, Carex foenea, C. rossii, Sitanion hystrix, Bromus ciliatus, Antennaria spp., Erigeron formosissimus, Lathyrus arizonicus, Vicia americana, Frageria spp., Potentilla hippiana.

CRYPTOGAMS:

DIS: Widespread in AZ, NM, s-CO.

ALSO SEE: ABCO/QUGA, Festuca arizonica phase; PSME/FEAR. The QUGA phase of ABCO/FEAR has gambel oak < 5 percent cover; the POFE phase has little or no Festuca arizonica. Along cold air drainages see also PIPU/FEAR. ABCO/LAAR and ABCO/RONE also have abundant or luxuriant herbaceous understories in colder or wetter environments.

COMMENTS: On certain grazing allotments Poa pratensis may be abundant. Forests in late succession may have few bunchgrasses (e.g. Festuca arizonica, etc), but these remain well expressed in local openings.

H. T.: White fir/Arizona fescue

REGENERATION METHODS:

Clearcut: Can be successful and necessary in mistletoe infested areas; can be used to favor aspen locally; plant to favor conifers.

Shelterwood: Heavy shelter favors white fir and Douglas-fir, less shelter favors ponderosa pine.

Seed Tree: Can be successful if ponderosa pine and Douglas-fir seed trees are left.

Selection: Favors white fir.

PLANTING:

Recommended Species: Ponderosa pine, Douglas-fir.

Success Probability: High.

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	B	B	B
Burning	B	B	

REVEGETATION: Usually rapid (strong herbaceous response).

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 1.5

TSI: Often needed to reduce stocking and to reduce white fir component of stand.

PRODUCTIVITY: 20 [/\ ] 100

Site Index 77 + (PIPO) 63 + (PSME) + N = 7

Resource Value Rating (Cattle): Early Seral H Late Seral L

OTHER: Excellent sites for ponderosa pine and growth of scenic, large yellow pines. Low intensity (surface) fires can be a useful management tool. Mosaics of stands of different successional stages have good wildife benefits.

Abies concolor/Lathyrus arizonicus

White fir/Arizona peavine 001070
ABCO/LAAR

SYN: Abies concolor-Pseudotsuga menziesii/Lathyrus arizonicus (Moir and Ludwig 1979).

SITE: N-slopes and elevated plains 8,500-9,400 ft.; MAP = 27 in/yr.

TES: 6, 0.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUDE	JUMO
a		a	S	C	C	s		s				

SHRUBS: Common to well represented. Berberis repens, Symphoricarpos oreophilus, Lonicera arizonica, Juniperus communis, Pachistima myrsinites.

HERBS: Well represented to luxuriant. Lathyrus arizonicus, Smilacina stellata, Disporum trachycarpum, Thalictrum fendleri, Poa fendleriana, Carex foenea, C. geyeri, Liqusticum porteri, Thermopsis pineturum.

CRYPTOGAMS:

DIS: n-AZ (Bill Williams Mt, San Francisco Peaks), local in NM.

ALSO SEE: As environments become drier, this h.t. grades into ABCO/BERE. The well expressed herb cover, however, distinguishes ABCO/LAAR. ABCO/FEAR is also similar, but occurs on warmer sites. ABCO/EREX indicates colder environments. See TES mapping unit 350 for Carson National Forest (Edwards 1987).

COMMENTS:

H. T.: White fir/Arizona peavine

REGENERATION METHODS:

Clearcut: Favors aspen and pine.

Shelterwood: Heavy shelter favors white fir and Douglas-fir, less shelter favors pine.

Seed Tree: Can be successful if Douglas-fir and ponderosa pine are left.

Selection: Favors white fir.

PLANTING:

Recommended Species: Douglas-fir, ponderosa pine (on selected sites).

Success Probability: High

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	B	B	B
Burning	A	A	

REVEGETATION: Rapid (strong herbaceous response).

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 1.5

TSI: May be needed to reduce stocking or white fir component.

PRODUCTIVITY:

Site Index _____ _____ _____ Productivity High

Forage Value Rating (Cattle): Early Seral Moderate Late Seral Low

OTHER: High scenic quality with good potential for tall aspen groves.

Abies concolor/Quercus gambelii

White fir/Gambel oak
ABCO/QUGA

QUGA phase 001050
FEAR phase 001052

SYN: ABCO-PSME/QUGA (Johnston 1984).

SITE: A wide array of sites, 7,400-9,600 ft., but commonly on moderate to very steep slopes; MAP 27 in/yr (can be as low as 24 in/yr e.g., Sunspot, NM).

TES: 6, 0.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIPO	QUGA	PIED	JUSC	JUDE	JUMO
			a	C	C	S	S	S	a		a	

SHRUBS: Usually abundant. Quercus gambelii*, Robinia neomexicana, Symphoricarpos oreophilus, Rosa spp., Pachistima myrsinites, Berberis repens, Jamesia americana.

HERBS: Well represented or abundant. Poa fendleriana, Bromus ciliatus, Carex rossii, Koeleria macrantha, Festuca arizonica (FEAR phase), Muhlenbergia montana, Danthonia parryi (FEAR phase), Geranium spp., Thalictrum fendleri, Achillea millefolium, Vicia americana, Lathyrus arizonicus, Thermopsis divaricarpa.

CRYPTOGAMS:

DIS: Common and widespread throughout the Southwest (AZ, NM, UT, s-CO).

ALSO SEE: ABCO/FEAR or ABCO/SYOR if Quercus gambelii is poorly represented.

COMMENTS:

H. T.: White fir/Gambel oak

REGENERATION METHODS:

Clearcut: Strongly favors oak.

Shelterwood: Favors conifers if enough shelter is retained to partially suppress oaks.

Seed Tree: Favors oak.

Selection: Favors white fir.

PLANTING:

Recommended Species: Ponderosa pine, Douglas-fir.

Success Probability: High

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	B	B	
Burning	H	H	

REVEGETATION: Rapid due to oak sprouting.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 1.5

TSI: Usually needed to reduce proportions of white fir and competition from oak.

PRODUCTIVITY: 20 _____/_____ 100

Site Index 61 + 12 (PSME) 59 + 10 (PIPO) _____ N = 20

Resource Value Rating (Cattle): Early Seral L-M Late Seral L-N

OTHER: Good food and cover for wildlife in all successional stages. For description of successional stages see Hanks and Dick-Peddie (1974).

Abies concolor/Robinia neomexicana

White fir/New Mexico locust
ABCO//RONE

RONE phase 001110
CAFO phase 001111

SYN:

SITE: Cinder cones and volcanic ash soils, 8,500-8,800 ft.; MAP 27 in/yr.

TES: 6, 0

TREES: (by phase)

	ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIPO	QUGA	PIED	JUSC	JUDE	JUMO
Robinia neomexicana				S	C	S	s	S					
Carex foenea (n-NM)				S	C	C		S					

SHRUBS: Well represented to abundant. Robinia neomexicana, Lonicera arizonica, Quercus gambelii, Amelanchier alnifolia, Rubus parviflorus, Rubus strigosus, Acer glabrum.

HERBS: Well represented. Carex foenea, Fragaria americana, Smilacina stellata, S. racemosa, Geranium richardsonii, Viola canadensis, Bromus ciliatus, Oryzopsis asperrifolia.

CRYPTOGAMS:

DIS: Apache NF (Springerville and Lakeside RDs) - volcanic cones, AZ; Santa Fe NF (Jemez RD) - Jemez Cauldera and vicinity, Jemez Mts, NM possibly local in other areas.

ALSO SEE: ABCO/EREX, ABCO/QUGA, ABCO/LAAR, and ABCO/FEAR.

COMMENTS:

H. T.: White fir/New Mexico locust

REGENERATION METHODS:

Clearcut: Favors locust and dense sedge and should be planted quickly.

Shelterwood: Usually successful if enough shelter is retained to suppress locust, sedges, and other herbs.

Seed Tree: Favors shrubs and herbs, seldom successful.

Selection: Favors white fir.

PLANTING:

Recommended Species: Ponderosa pine, Douglas-fir.

Success Probability: Moderate to high.

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	B	B	B
Burning	H, A	H	

REVEGETATION: Rapid from locust establishment and herbs.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 1.7

TSI: Sometimes needed to reduce stocking or severe shrub competition.

PRODUCTIVITY:

Site Index 63 + ? / PIPO _____ _____ Productivity M to H

Forage Value Rating (Cattle): Early Seral High Late Seral Low

OTHER: Early seral stages provide good wildlife forage and cover. Certain soils are high productivity for ponderosa pine but have severe soil limitations (see TES reports).

White fir/New Mexico locust

Habitat Type (28)

Abies concolor/Symphoricarpus oreophilus

White fir/Snowberry
ABCO/SYOR

PIPO phase 001140
PIFL phase 001141

SYN: Abies concolor-Pseudotsuga menziesii/Symphoricarpos oreophilus (Johnston 1984).

SITE: Mostly steep slopes, 8,500-9,500 ft., but to 10,500 ft., on s or w slopes; deep cobbly or gravelly soils (often Typic Dystochrepts).

TES: 6, 0, (PIPO phase); 6, +1 (PIFL phase).

TREES: (by phase)

	ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
Pinus ponderosa				s	C	C			S				
Pinus flexilis				s	C	C	S	s					

SHRUBS: Well represented. Symphoricarpos oreophilus, Holodiscus dumosus, Jamesia americana, Juniperus communis, Berberis repens, Quercus gambelii, Acer glabrum, Physocarpus monogynus.

HERBS: Common to well represented. Bromus ciliatus, Koeleria macrantha, Poa fendleriana, Carex foenea, C. rossii, Oreochrysum parryi, Achillea millefolium, Allium cernuum, Lathyrus arizonicus, Senecio spp.

CRYPTOGAMS:

DIS: n-NM and n-AZ into UT and CO.

ALSO SEE: Youngblood and Mauk (1985) describe a h.t. in UT resembling our PIPO phase; TES mapping unit 922 on Carson NF (Edwards 1987). ABCO/ACGL intergrades into ABCO/SYOR but typically occupies wetter or colder sites. ABCO/BERE occupies drier or more nutrient improverished sites.

COMMENTS:

Abies concolor/Vaccinium myrtillus

White fir/Myrtle leaf huckleberry 001100
ABCO//VAMY

SYN: Abies concolor-Pseudotsuga menziesii/Vaccinium myrtillus (Johnston 1984).

SITE: Cold n-slopes and draws, mostly 8,700-9,400 ft.; wide range of soils; moderate snowpack (see comment).

TES: 7, -1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
c	c		S	C	C			a				

SHRUBS: Luxuriant. Vaccinium myrtillus*, Pachistima myrsinites, Acer glabrum, Amelanchier alnifolia, Berberis repens, Symphoricarpos oreophilus, Rubus parviflorus.

HERBS: Well represented. Erigeron eximius, Artemisia franserioides, Fragaria ovalis, Lathyrus spp., Viola canadensis, Bromus ciliatus, Oryzopsis asperifolia.

CRYPTOGAMS:

DIS: n-NM, s-CO.

ALSO SEE:

COMMENTS: This is the coldest of the white fir habitat types; it is also the warmest extreme of the cryic soil temperature regime.

Pseudotsuga menziesii/Berberis repens

Douglas-fir/Oregon Grape
PSME/BERE

012030

SYN: Pseudotsuga menziesii/sparse undergrowth (Alexander et al 1984), Pseudotsuga menziesii/Mahonia repens (Johnston 1984).

SITE: Special topographic sites that are relatively dry and possibly nutrient poor on a variety of slopes and aspects, 7,000-8,500 ft.

TES: 6, -1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	P*IFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
			a		C	S		s	s			

*See comment.

SHRUBS: Poorly represented. Berberis repens, Juniperus communis, Symphoricarpos oreophilus, Pachistima myrsinites, Quercus gambelii, Ceanothus fendleri.

HERBS: Scarce or poorly represented. Poa fendleriana, Festuca arizonica, Bromus ciliatus, Valeriana capitata (V. acutiloba), Clematis columbiana, Thalictrum fendleri, Antennaria parvifolia.

CRYPTOGAMS:

DIS: c-AZ into UT and ID; local in n-NM and s-CO.

ALSO SEE: PSME/PHMO if shrubs are well represented. If herb cover is well represented see PSME/FEAR. If Quercus gambelii is well represented see PSME/QUGA.

COMMENTS: On the North Kaibab plateau, Pinus flexilis is usually absent from this association.

Pseudotsuga menziesii/Bromus ciliatus

Douglas-fir/Fringed brome
PSME/BRCI

012320

SYN:

SITE: Ridges and n- or e-facing upper slopes with deep soils, 9,300-10,100 ft.; cold, wet, windy sites, but dry in May and June.

TES: 6, +1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIST	PIPO	QUGA	PIED	JUSC	JUDE	JUMO
	a		s		C	S	a					

SHRUBS: Scarce to abundant. Holodiscus dumosus, Acer glabrum, Physocarpus monogynus, Jamesia americana, Ribes pinetorum.

HERBS: Luxuriant. Bromus ciliatus, Poa fendleriana, Trisetum montanum, Achillea millefolium, Erigeron eximius, Oreochrysum parryi, Thalictrum fendleri, Vicia americana, Smilacina stellata.

CRYPTOGAMS:

DIS: se-AZ and sw- to c-NM, local in n-NM.

ALSO SEE: ABCO/EREX if Abies concolor has common regeneration in mature stands. PSME/FEAR, Populus tremuloides phase represents an enviornment integrading to PSME/BRCI.

COMMENTS:

H. T.: Douglas-fir/Fringed brome

REGENERATION METHODS:

Clearcut: Can be successful if planted promptly. Large openings are subject to wind scouring.

Shelterwood: Is usually successful.

Seed Tree: Windthrow is a problem especially when soils are wet.

Selection: Favors Douglas-fir.

PLANTING:

Recommended Species: Southwestern white pine, Douglas-fir.

Success Probability: High if planted before site is occupied by grasses and sedges.

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	H	B	B
Burning		B	B

REVEGETATION: Rapid due to herbaceous regrowth.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 1.7

TSI: Sometimes needed to reduce stocking.

PRODUCTIVITY: (no data)

Site Index _____ _____ _____ Productivity Moderate

Resource Value Rating (Cattle): Early Seral H Late Seral M-L

OTHER: Excellent summer range for deer and elk. Early seral stages have good forage for turkeys and small mammals.

Pseudotsuga menziesii/Festuca arizonica

	Typic phase	012330
	Pinus aristata phase	012331
Douglas-fir/Arizona fescue	Pinus flexilis phase	012332
PSME/FEAR	Populus tremuloides ph.	012333

SYN: Pinus strobiformis/Festuca arizonica (Moir and Ludwig 1979).

SITE: Dry upper s-slopes or ridges, 9,200-10,200 ft.

TES: 6, -1.

TREES:

	ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
PIAR and PIFL phases				s	a	C	c	c	s				
Populus tremuloides phase				S	a	C	s	s	S				

SHRUBS: Common or well represented. Holodiscus dumosus, Quercus gambelii, Ceanothus fendleri, Ribes cercum, Symphoricarpos oreophilus, Arctostaphylos uva-ursi (NM and s-CO).

HERBS: Well represented (sometimes abundant). Festuca arizonica, Bromus ciliatus, Muhlenbergia montana, Poa fendleriana, Koeleria macrantha, Achillea millefolium, Lathyrus arizonicus, Senecio wootoni, Erigeron formosissimus, Poa pratensis (especially in POTR phase).

DIS: Local throughout NM, s-CO, and c-AZ.

ALSO SEE: PSME/BRCI occurs on wetter, colder sites; PSME/MUMO and PIAR/FEAR are environmentally indistinguishable. For description of PSME/FEAR in AZ see Alexander et al 1984b; in n-NM and s-CO, DeVelice et al 1986.

COMMENT: In Zuni Mts, NM and locally elsewhere, PSME/FEAR,POTR phase may be indistinguishable from ABCO/FEAR (where Abies concolor is absent by accident of geography and migration (Alexander et al 1987)).

H. T.: Douglas-fir/Arizona fescue

REGENERATION METHODS:

Clearcut: Can be successful, especially if kept small.

Shelterwood: Is usually successful.

Seed Tree: Is sometimes useful to favor ponderosa pine.

Selection: Is usually successful in mistletoe free stands.

PLANTING:

Recommended Species: Ponderosa pine, Douglas-fir.

Success Probability: Moderate to high.

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	B	B	
Burning	B	B	B

REVEGETATION: Moderately rapid.

STOCKABILITY: BUDWORM SUSCEPTIBILITY: 1.5

TSI: Sometimes needed to reduce stocking in thickets.

PRODUCTIVITY: 20 ____/_____ 100

Site Index _____ _____ _____ N = 11

Forage Value Rating (Cattle): Early Seral H Late Seral L

OTHER: Potential for wildlife cover is good if proportion of Douglas-fir in stand is high. Good forage potential and summer range for elk.

Pseudotsuga menziesii/Muhlenbergia montana

Douglas-fir/Mountain muhly
PSME/MUMO

Pinus edulis phase 012340
Pinus flexilis phase 012341

SYN:

SITE: Steep s- or w-upper slopes, 8,700-9,700 ft. to northerly lower slopes 7,500-8,000 ft.; very dry soils (low water holding capacity), often very cobbly/gravelly or shallow; Typic or Lithic Dystochrepts (higher elevations), Typic or Lithic Ustochrepts (lower elevations); verify on-site soils.

TES: 5, 0 (PIED phase) to 6, -1 (PIFL phase).

TREES: (by phase)	ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUDE*	QUGA
Pinus edulis						c	a		C	c	c	c	s
Pinus flexilis					a	C	c		C	s	s		s

*c- and sw-NM.

SHRUBS: Usually poorly represented. Quercus gambelii, Ceanothus fendleri, Holodiscus dumosus, Ribes cereum, Cercocarpus montana.

HERBS: Well represented. Blepharoneuron tricholepis, Bromus spp., Carex spp., Koeleria macrantha, Poa fendleriana, Muhlenbergia montana, Sitanion hystrix, Lithospermum multiflorum, Erigeron platyphyllus, Geranium caespitosum.

DIS: sw- and c-NM to n-NM; local in se-AZ.

ALSO SEE: TES mapping unit 202, Cimarron Mts. NM (Edwards 1987); PSME/MUMO in Fitzhugh et al (1987); Pseudotsuga menziesii/Carex rossii (Hess and Alexander 1980) in CO.

COMMENTS: Steep slopes and low site productivity for trees usually precludes timber management; good environment for deer.

Pseudotsuga menziesii/Physocarpus monogynus

Douglas-fir/Ninebark
PSME/PHMO

012130

SYN:

SITE: Very steep slopes with gravelly or cobbly, excessively drained soils, 7,000-9,500 ft.; limited topographic sites in landscape.

TES: 6, -1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
				a	C	s	s	s	a			

SHRUBS: Well represented to abundant. Acer glabrum, Physocarpus monogynus, Quercus gambelii, Pachistma myrsinites, Berberis repens, Rosa spp., Holodiscus dumosus, Jamesia americana, Prunus virginiana, Symphoricarpos oreophilus.

HERBS: Well represented. Solidago spp., Geranium richardsonii, Bromus ciliatus, Smilacina stellata, Muhlenbergia montana, Poa fendleriana

DIS: c-NM (San Mateo Mts.) into CO.

ALSO SEE: Pseudotsuga menziesii/Jamesia americana (Hess and Alexander 1986) and Pseudotsuga menziesii/Symphoricarpos oreophilus (Johnston 1984) are perhaps indistinguishable. PSME/BERE has weaker expression of herbs and shrubs, but intergrades to PSME/PHMO. If soils are fragmental (> 90 percent gravels and cobbles), see scree forests.

COMMENTS:

Pseudotsuga menziesii/Quercus gambelii

Douglas-fir/Gambel oak
PSME/QUGA

QUGA phase 012140
FEAR phase 012141
MUVI phase 012142

SYN:

SITE: Numerous slopes, aspects, and landforms 6,900-8,000 ft.; often on restricted topography within Abies concolor zone (e.g. s-slopes) or within Pinus ponderosa zone (e.g. n-slopes).

TES: 6, -1 HSC, LSC.

TREES: (by phase)

	ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIST	PIPO	QUGA	PIED	JUSC	JUDE	JUMO
QUGA, FEAR, MUVI phases					a	C	s	S	S	s			

SHRUBS: (Including shrubby forms of Gambel oak) Well represented to luxuriant. Quercus gambelii*, Robinia neomexicana, Symphoricarpos oreophila, Pachistima myrsinites, Berberis repens, Rosa spp., Holodiscus discolor, Ceanothus fendleri.

HERBS: Well represented to abundant. Poa fendleriana, Koeleria macrantha, Carex rossii, Festuca arizonica (> 5 percent cover in FEAR phase), Muhlenbergia virescens (> 5 percent cover in MUVI phase), Thalictrum fendleri, Vicia americana, Lathyrus arizonica, Achillea millefolium.

DIS: Widespread in NM, AZ, s-CO, UT.

ALSO SEE: If Quercus gambelii < 5 percent cover, see PSME/FEAR. If herbaceous cover < 5 percent see PSME/BERE.

COMMENTS:

H. T.: Douglas-fir/Gambel oak

REGENERATION METHODS:

Clearcut: Favors oak over conifers.

Shelterwood: Usually successful if enough shade remains to help suppress oaks.

Seed Tree: Seldom successful.

Selection: Favors Douglas-fir.

PLANTING:

Recommended Species: Ponderosa pine, Douglas-fir, Southwestern White pine.

Success Probability: Moderate

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	B	B	
Burning	H	H	H

REVEGETATION: Usually rapid.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 1.5

TSI: Sometimes needed to reduce oak competition.

PRODUCTIVITY: 20 ___/___ 100

Site Index $\frac{61 + 8}{\text{PIPO}}$ $\frac{52 + 8}{\text{PSME}}$ _____ N = 12

Resource Value Rating (Cattle): Early Seral L-M Late Seral L-none

OTHER: Good potential for wildlife food and cover.

Pinus ponderosa/Artemisia arbuscula

Ponderosa pine/Low sagebrush 011380
PIPO/ARARN

SYN: Pinus ponderosa/Artemisia nova h.t. (Youngblood and Mauk 1985).

SITE: Elevations around 8,200 ft., elevated basaltic plains.

TES: 5, -1.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIST	PIPO	QUGA	PIED	JUSC	JUDE	JUMO
							C	s	C	C		

SHRUBS: Abundant. Artemisia arbuscula*, A. tridentata, Quercus gambelii, Ribes cercum, Symphoricarpos oreophilus.

HERBS: Well represented. Poa fendleriana, Koeleria macrantha, Carex spp., Bouteloua gracilis, Sitanion hystrix, Erigeron flagellaris, Muhlenbergia montana.

CRYPTOGAMS:

DIS: n-NM, n-AZ, s-UT, s-CO.

ALSO SEE: PIPO/BOGR, ARTR phase is perhaps environmentally indistishable under present knowlegde; compare also with PIPO/BOGR, PIED phase described by Hanks et al (1983).

H. T.: Ponderosa pine/Dwarf sage

REGENERATION METHODS:

Clearcut: Not usually successful.

Shelterwood: Sometimes successful.

Seed Tree: Not usually successful.

Selection: Sometimes successful.

PLANTING:

Recommended Species: Ponderosa pine.

Success Probability: Low

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	H	H	
Burning	H	H	

REVEGETATION: After disturbance, moderate to slow.

STOCKABILITY: 0.6 BUDWORM SUSCEPTIBILITY: 0

TSI: Sometimes needed to reduce competition from Pinyon and Juniper.

PRODUCTIVITY: (No data)

Site Index _____ _____ _____ Productivity Low

Forage Value Rating (Cattle): Early Seral Low Late Seral None

OTHER: Good potential for fuelwood production. Minor habitat type. Good winter range for elk.

Pinus ponderosa/Arctostaphylos uva-ursi

Ponderosa pine/Kinnikinnik 011400
PIPO/ARUV

SYN:

SITE: Shallow soils of ridgetops, stony or excessively drained soils on other slopes, 7,800-9,000 ft.

TES: 5, 0

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
					a			C	a			

SHRUBS: Abundant. Arctostaphylos uva-ursi*, Quercus gambelii, Cercocarpus montanus, Ceanothus fendleri, Ribes cereum.

HERBS: Well represented. Muhlenbergia montana, Poa fendleriana, Koeleria macrantha, Festuca arizonica, Carex spp., Erigeron formosissimus, Potentilla hippiana, Antennaria rosea.

DIS: n-NM and s-CO.

ALSO SEE:

H. T.: Ponderosa pine/Kinnikinnik

REGENERATION METHODS:

Clearcut: Not usually successful.

Shelterwood: Usually successful.

Seed Tree: Sometimes successful.

Selection: Usually successful.

PLANTING:

Recommended Species: Ponderosa pine.

Success Probability: Moderate

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical		B	
Burning		B	

REVEGETATION: After disturbance, moderate.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 0

TSI: Sometimes needed to reduce stocking.

PRODUCTIVITY: PIPO

Site Index 57 + 10 _____ _____ Productivity M-L

Forage Value Rating (Cattle): Early Seral Low Late Seral None

OTHER: Can provide good forage for deer and turkey. Natural fires are frequent in this habitat type.

Pinus ponderosa/Bouteloua gracilis

Ponderosa pine/Blue grama
PIPO/BOGR

Bouteloua gracilis phase	011030
Andropogon scoparium phase	011031
Andropogon hallii phase	011032
Artemisia tridentata phase	011033
Quercus gambelii phase	011035

SITE: 6,300-7,500 ft. (AZ) or 8,500 ft. (NM); topography and soil highly variable; MAP = 19 in/yr; driest, warmest margins of ponderosa pine forest.

TES: 5, -1 LSC, HSC.

TREES:	ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	JUOS	QUGA
									C	C	c	c	c	s

SHRUBS: Poorly represented. Quercus gambelii (QUGA phase), Artemisia tridentata (ARTR phase), Purshia tridentata (ARTR phase), Chrysothamnus nauseosus, Gutierrezia sarothrae, Ribes cereum, Rhus trilobata, Hymenoxys richardsonii, Fallugia paradoxa (ANHA phase).

HERBS: Well represented especially grasses. Bouteloua gracilis, Poa fendleriana, Stipa spp., Andropogon scoparium (ANSC phase), A. hallii (cinder soils), Muhlenbergia montana, Sitanion hystrix, Blepharoneuron tricholepis, Koeleria macrantha, Aristida fendleriana, A. arizonica, Eriogonum racemosum, Lotus wrightii, Antennaria spp., Artemisia ludoviciana, Erigeron flagellaris, Senecio neomexicanus, Geranium caespitosum.

DIS: Widespread in NM, AZ, CO, s-UT.

ALSO SEE: Pinus ponderosa/Muhlenbergia montana in s-UT (Youngblood and Mauk 1985); Pinus ponderosa/Bouteloua gracilis, Pinus edulis phase (Hanks et al 1983); TES mapping unit 162 for Carson NF (Edwards 1987); Pinus ponderosa/Purshia tridentata in s-CO (Johnston 1984).

COMMENTS: Bouteloua gracilis and shrubs increase on overgrazed livestock ranges. Fallugia paradoxa can dominate on deep, cinder soils.

H. T.: Ponderosa pine/Blue grama

REGENERATION METHODS:

Clearcut: Is usually unsuccessful.

Shelterwood: Is often the best method.

Seed Tree: Is not usually successful.

Selection: Is usually successful.

PLANTING:

Recommended Species: Ponderosa pine.

Success Probability: Low to moderate.

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	B	B	B
Burning		B	

REVEGETATION: Slow; sites may have high soil erosion potential.

STOCKABILITY: 0.8 BUDWORM SUSCEPTIBILITY: 0

TSI: Sometimes needed to reduce stocking.

PRODUCTIVITY: 20 _____/_____ 100

Site Index $\frac{60 + 18}{PIPO}$ _____ _____ N = 6

Forage Value Rating (Cattle): Early Seral H Late Seral M

OTHER: Large ponderosa pine may be important turkey roosts. Junipers may be important mid-seral dominants on some sites. Gambel oak, when present, offers mast and cover for wildlife. Fuel wood potential is often high.

Pinus ponderosa/Cowania mexicana

Ponderosa pine/Cliffrose 011320
PIPO/COME

SYN: Pinus ponderosa/Cowania mexicana community type (Hanks et al 1983).

SITE: Rough, rocky topography at warmer limits of ponderosa pine forests, 6,700-7,400 ft., usually calcareous soils; MAP 19-20 in/yr.

TES: 5, -1, LSC, HSC.

TREES:	ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	JUOS	QUGA
						c			C	C	c		C	s

SHRUBS: Well represented. Cowania stansburiana var mexicana*, Purshia tridentata (Zuni Mts., NM), Quercus gambelii, Rhus trilobata, Yucca baccata, Y. glauca, Berberis repens.

HERBS: Well represented. Muhlenbergia montana, Aristida arizonica, Poa fendleriana, Blepharoneuron tricholepis, Andropogon scoparius, Sitanion hystrix, Bouteloua gracilis, Eriogonum racemosum, Chaenactis douglasii, Lotus wrightii, Solidago spp., Tradescantia pinetorum, Chrysopsis villosa.

DIS: c- and n-AZ, local in c- and n-NM (Zuni Mts., Jicarilla Apache Reservation); UT, CO, WY, ID.

ALSO SEE: Pinus ponderosa/Purshia tridentata (Johnston 1984, Youngblood and Mauk 1985).

COMMENTS: For hybridization between Cowania and Purshia see McArthur et al (1983).

H. T.: Ponderosa pine/Cliffrose

REGENERATION METHODS:

Clearcut: Not usually successful.

Shelterwood: Usually successful.

Seed Tree: Not usually successful.

Selection: Usually successful.

PLANTING:

Recommended Species: Ponderosa pine.

Success Probability: Low

SITE PREPARATION

	INTENSITY		
Method	High	Moderate	Low
Mechanical	H	H	B
Burning	H	B	B

REVEGETATION:

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 0

TSI: Occasionally needed.

PRODUCTIVITY:

Site Index _____ _____ _____ Productivity Low

Resource Value Rating (Cattle): Early Seral Low Late Seral Low

OTHER: Important browse producer for wintering big game. Has good potential for firewood production.

Pinus ponderosa/Festuca arizonica

	FEAR phase	011090
	DAPA phase	011091
Ponderosa pine/Arizona fescue	BOGR phase	011092
PIPO/FEAR	QUGA phase	011093

SYN:

SITE: Elevated and valley plains, piedmont hillslopes and mountain slopes, 7,200-8,800 ft. (to 9,400 ft. on s-slopes); MAP 20-25 in/yr.

TES: 5, 0 (5, +1 DAPA phase).

TREES: (by phase)	ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
Danthonia parryi phase				s	a	c			C		s		
Festuca arizonica phase						a			C	a	a		
Quercus gambelii phase									C	s	a	a	s
Bouteloua gracilis phase									C	s	s	s	

SHRUBS: Scarce. Quercus gambelii (QUGA phase), Ribes cereum, Ceanothus fendleri, Cerocarpus montana, Gutierrezia sarothrae (BOGR phase).

HERBS: Well represented to abundant. Festuca arizonica*, Muhlenbergia montana, Bouteloua gracilis (< 2 percent cover in BOGR phase), Stipa pringlei, Danthonia parryi (DAPA phase), Koeleria macrantha, Blepharoneuron tricholepis, Carex rossii, Sitanion hystrix, Lithospermum multiflorum, Antennaria spp., Potentilla hippiana, Heterotheca fulcrata, Artemisia ludoviciana, A. carruthii, Pteridium aquilinum, Poa pratensis.

DIS: Widespread in NM, c-AZ, s-CO; infrequent s of the Rim.

ALSO SEE: Pinus ponderosa/Muhlenbergia montana on the north Kaibab plateau is very similar but lacks Festuca arizonica; Pinus ponderosa/Poa longiligula community type (Hanks et al 1983); Currie (1975); Pearson (1950). The Danthonia parryi phase very closely resembles ABCO/FEAR.

COMMENTS: Poa pratensis or Pteridium aquilinum can dominate where fires or livestock grazing have had past or repeated occurrences.

H. T.: Ponderosa pine/Arizona fescue

REGENERATION METHODS:

Clearcut: Is sometimes needed in heavy mistletoe infected stands.

Shelterwood: Almost always successful. Regeneration is often very abundant, forming thickets or dense patches.

Seed Tree: Is often successful.

Selection: Favors ponderosa pine in mistletoe free stands.

PLANTING:

Recommended Species: Ponderosa pine.

Success Probability: High

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	B	B	
Burning	B	B	

REVEGETATION: Moderately rapid.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 0

TSI: Usually needed to reduce stocking. Regeneration of pine tends to form dense thickets when conditions are favorable.

PRODUCTIVITY: 20 _____/_____ 100

Site Index $\frac{58 + 13}{\text{PIPO}}$ _____ _____ N = 25

Forage Value Rating (Cattle): Early Seral High Late Seral M-L

OTHER: Open stands with grassy understories are "parklike" and attractive to recreationists. Poor potential for hiding cover expect where pine thickets exist. Burning can stimulate Ceanothus fendleri (an important browse species) on some sites. Prescribed fire can also be used to reduce pine thickets and maintain parklike views.

Pinus ponderosa/Muhlenbergia montana

Ponderosa pine/Mountain muhly 011330
PIPO/MUMO

SYN: Pinus ponderosa/Poa longiliqula community type (Hanks et al 1983).

SITE: Gentle and moderate slopes, 7,500-8,500 ft.; MAP 22-23 in/yr. Precipitation at Jacob Lake AZ (7920 ft) is 18.5 in/yr, about 60% of which occurs from October through March.

TES: 5, 0.

TREES: (by geography)	ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
North Kaibab Plateau				a		a			C	a			
Elsewhere				a		a			C	c	c	c	s

SHRUBS: Common. Ceanothus fendleri, Quercus gambelii, Cercocarpus montanus, Berberis repens, Hymenoxys richardsonii.

HERBS: Well represented to abundant, especially grasses. Muhlenbergia montana, Blepharoneuron tricholepis, Poa fendleriana, Koeleria macrantha, Carex spp., Sitanion hystrix, Bouteloua gracilis (usually scarce), Andropogon spp., Lotus wrightii, Lithospermum multiflorum, Senecio neomexicanus, S. multilobatus, Erigeron flagelleris, Geranium caespitosum, Antennaria spp, Achillea millefolium.

CRYPTOGAMS:

DIS: sw- and c-NM to CO; c-AZ to s-UT.

ALSO SEE: Pinus ponderosa/Festuca arizonica is distinguished by Festuca arizonica common. PIPO/MUMO described by Hess and Alexander (1986) and Youngblood and Mauk (1985) may be geographic phases. Certain stands classified as PIPO/BOGR, Bouteloua gracilis phase by Hanks et al (1983) are assigned here to PIPO/MUMO if Bouteloua gracilis < 5% cover.

COMMENTS: Seral stages of PIPO/FEAR, especially on livestock allotments (pine-bunchgrass range) can resemble PIPO/MUMO. Heavily grazed lands of PIPO/MUMO can also resemble PIPO/BOGR.

H. T.: Ponderosa pine/Mountain muhly

REGENERATION METHODS:

Clearcut: Sometimes successful and needed in mistletoe infected stands.

Shelterwood: Usually successful for ponderosa pine.

Seed Tree: Is often successful for ponderosa pine.

Selection: Is usually successful.

PLANTING:

Recommended Species: Ponderosa pine.

Success Probability: High or moderate.

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	B	B	B
Burning	B	B	B

REVEGETATION: Usually rapid.

STOCKABILITY: 1 BUDWORM SUSCEPTIBILITY: 0

TSI: Is often necessary, especially where regeneration occurs in dense patches.

PRODUCTIVITY: 20 _____/_____ 100

Site Index 58 + 13 (PIPO) _____ _____ N = 8

Forage Value Rating (Cattle): Early Seral H Late Seral M

OTHER: Low potential for wildlife hiding cover. Burning tends to stimulate germination of Ceanothus fendleri, an important browse species. Stands can have high visual quality where large pines occur in clumped mosaics over grassy understories. Prescribed fires can be useful to reduce conifer thickets, maintain visual quality, and stimulate herbage production.

Pinus ponderosa/Oryzopsis hymenoides

Ponderosa pine/Indian ricegrass
PIPO/ORHY

011350

SYN:

SITE: Deep sandy soils, 6,000-6,300 ft.

TES: 5, -1.

TREES: (very open stands)	ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
									C			C	

SHRUBS: Common. Poliomintha incana*, Cercocarpus montanus.

HERBS: Common. Oryzopsis hymenoides, Schizachyrium scoparium, Sitaniun hystrix, Chrysopsis villosa, Sporobolus contractus, Andropogon hallii, Muhlenbergia pungens.

DIS: Very local in n-NM (Espanola Ranger District, Carson NF).

ALSO SEE:

COMMENTS:

H. T.: Ponderosa pine/Indian ricegrass

REGENERATION METHODS:

Clearcut: Not usually successful, can destabilize sandy soil.

Shelterwood: Sometimes successful.

Seed Tree: Not usually successful.

Selection: Sometimes successful.

PLANTING:

Recommended Species: Ponderosa pine.

Success Probability: Low

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	H	H	
Burning	H	H	

REVEGETATION: After disturbance, slow to very slow.

STOCKABILITY: 0.6 BUDWORM SUSCEPTIBILITY: 0

TSI: Not needed.

PRODUCTIVITY:

Site Index ? + ____ + ____ + ____ Productivity Low

Forage Value Rating (Cattle): Early Seral Low Late Seral Low

OTHER: Rare in occurrence, heavy disturbance can cause return to sand dune conditions.

Pinus ponderosa/Quercus gambelii

Ponderosa pine/Gambel oak
PIPO/QUGA

Quercus gambelii phase	011210
Festuca arizonica phase	011211
Pinus edulis phase	011213
Muhlenbergia montana ph.	011214

SYN:

SITE: 6,300-9,200 ft. on wide variety of slopes, landforms, and soils.

TES: 5, 0; 5, -1 (PIED phase).

TREES: (by phase)

	ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
QUGA and FEAR						a			C	a	c		S
PIED						a			C	C	c	c	S

SHRUBS: Abundant. Quercus gambelii (shrubby forms), Symphoricarpos oreophilus, Rosa spp., Cercocarpus montanus, Berberis repens, Ceanothus fendleri, Yucca glauca.

HERBS: Well represented. Poa fendleriana, Carex rossii, Bromus ciliatus, Muhlenbergia montana, Festuca arizonica (common in FEAR phase), Schizachyrium scoparium, Koeleria macrantha, Achillea millefolium, Artemisia ludoviciana, Chrysopsis villosa, Vicia americana.

CRYPTOGAMS:

DIS: Widespread in NM, AZ, CO, UT.

ALSO SEE: In Arizona gambel oak can assume a midstory tree form with herbs beneath. This has been described as gambel oak phases of PIPO/FEAR and PIPO/BOGR by Hanks et al (1983). The FEAR and MUMO phases of PIPO/QUGA typically consist of mosaics of oak and grasses in patchy distribution.

COMMENTS:

H. T.: Ponderosa pine/Gamble oak

REGENERATION METHODS:

Clearcut: Strongly favors oak over pine.

Shelterwood: Usually successful, favors pine if enough shelter is retained to partially surpress the oak.

Seed Tree: Favors oak over pine.

Selection: Usually successful, favors pine over oak.

PLANTING:

Recommended Species: Ponderosa pine.

Success Probability: High with good site preparation.

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	B	B	B
Burning	H	H	H

REVEGETATION:

STOCKABILITY: 1.0 BUDWORM SUSCEPTIBILITY: 0

TSI: Often needed to release pine from oak competition.

PRODUCTIVITY:

Site Index PIPO 47 _____ _____ Productivity Moderate

Resource Value Rating (Cattle): Early Seral Moderate Late Seral Low

OTHER: Good hiding cover in summer, browse production is often good from shrubs other than oak. Important source of mast for turkeys.

Pinus ponderosa/Quercus undulata

Ponderosa pine/Wavyleaf oak
PIPO/QUUN

011370

SYN:

SITE: Hot, dry sites between 6,500-7,500 ft. (s-slopes to 8,000 ft.); MAP 20-21 in/yr with hot, dry May and June.

TES: 5, -1; HSC.

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIST	PIPO	QUGA	PIED	JUSC	JUDE	JUMO
							C		S		s	s

SHRUBS: Well represented. Quercus undulata*, Rhus trilobata, Cercocarpus montana.

HERBS: Well represented. Muhlenbergia montana, Andropogon gerardi, Bouteloua curtipendula, B. gracilis, Aristida arizonica, Lycurus phleoides, Schizachyrium scoparium, Artemisia ludoviciana, Lithospermum multiflorum, Geranium caespitosum, Chrysopsis villosa.

DIS: s- and c-NM, local in n-NM.

ALSO SEE: PIPO/QUGA in warmer sites may have minor cover of wavyleaf oak.

COMMENTS:

H. T.: Ponderosa pine/Wavyleaf oak

REGENERATION METHODS:

Clearcut: Strongly favors oak over conifers.

Shelterwood: Is most often successful.

Seed Tree: Is not usually successful.

Selection: Favors pine where economically feasible.

PLANTING:

Recommended Species: Ponderosa pine.

Success Probability: Low

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	B	B	
Burning	H	H	H

REVEGETATION: Rapid due to oak sprouting.

STOCKABILITY: .8 BUDWORM SUSCEPTIBILITY: 0

TSI: Sometimes needed to control oak or to thin conifers.

PRODUCTIVITY: 20 /\ 100

Site Index 47 + ? / PIPO _____ _____ N = 3

Forage Value Rating (Cattle): Early Seral M Late Seral L

OTHER: Important for wildlife food and cover. Good potential for fuelwood production from pinyon and juniper. Can carry high intensity fires.

Pinus ponderosa/Rockland

Ponderosa pine/Rockland
PIPO/Rockland

011500

SYN:

SITE: Very shallow (< 10 in.) soil and exposed bedrock comprise about 50-90 percent of the surface; 7,500-8,500 ft.

TES: 5, -1, 0, +1

TREES:

ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIST	PIPO	QUGA	PIED	JUSC	JUDE	JUMO
							C		c		c	c

SHRUBS: Scarce. Quercus gambelii, Cercocarpus montanus, Yucca spp., Gutierrezia sarothrae, Fallugia paradoxa.

HERBS: Scarce to common. Muhlenbergia montana, Bouteloua curtipendula, Bouteloua hirsuta, Solidago spp., Blepharoneuron tricholepis, Schizachyrium scoparium (Andropogon scoparius).

CRYPTOGAMS:

DIS: Local in Zuni Mts., NM, Santa Catalina Mts, AZ, and elsewhere.

ALSO SEE: Malpais rockland described by Lindsey (1951) can be assigned to PIPO/Rockland.

COMMENTS: Ponderosa pine was formerly named Pinus scopulorum meaning rock pine.

H. T.: Ponderosa pine/Rockland

REGENERATION METHODS:

Clearcut: Not appropriate.

Shelterwood: Not appropriate.

Seed Tree: Not appropriate.

Selection: Not appropriate.

PLANTING:

Recommended Species: Ponderosa pine.

Success Probability: Very low.

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	H	H	H
Burning	H	H	

REVEGETATION: Very slow.

STOCKABILITY: 0.4 BUDWORM SUSCEPTIBILITY: 0

TSI: Not appropriate.

PRODUCTIVITY:

Site Index _____ _____ _____ Productivity Very Low

Forage Value Rating (Cattle): Early Seral None Late Seral None

OTHER: Often attractive with rock outcrops and scattered large trees. Dwarfed pine growing in rock fissures may be hundreds of years old. Pinus ponderosa var. scopulorum means ponderosa pine "of the rocks" or rock pine.

Scree Forests

260000

SYN: Abies lasiocarpa/Saxifraga bronchialis (DeVelice et al 1986).
Abies lasiocarpa/Holodiscus dumosus (Fitzhugh et al 1986).
Abies concolor/Holodiscus dumosus (DeVelice et al 1986).
Abies concolor/Jamesia americana (Fitzhugh et al 1986).
Pseudotsuga menziesii/Holodiscus dumosus (DeVelice et al 1986, Fitzhugh et al 1986).
Pinus ponderosa/Ribes inerme (DeVelice et al 1986).
Abies concolor-Pseudotsuga menziesii/Holodiscus dumosus (Johnston 1984).

SITE: Usually moderate or steep slopes below cliffs; soils are mostly cobbles and boulders, these coarse fragments (including stones and gravels) comprising > 90 percent of soil volume.

TES: All climatic and elevational zones (5, 6, 7,); Entisols (talus, scree, rock glaciers, etc.).

TREES: Usually open, sparsely stocked stands, composition depends upon climate.

SHRUBS: Scarce to well represented. Ribes spp., Jamesia americana, Holodiscus dumosus, Salix scouleriana, Acer glabrum.

HERBS: Scarce. Variable.

CRYPTOGAMS: Well represented to abundant. Lichens on rocks are especially conspicuous.

DIS: Throughout the Southwest.

ALSO SEE: ABCO/ELTR and PIEN/ELTR (both in Capitan Mts. NM), Pseudotsuga menziesii/Paxistima myrsinites (Komarkova 1986), Pseudotsuga menziesii/Jamesia americana (Johnston 1984).

MANAGEMENT IMPLICATIONS: These are generally noncommercial forests. Depending upon locality and geography, the scree environment may feature special animal populations such as certain lizards, snakes, small mammals (chipmunks, pika, etc.).

H. T.: Scree

REGENERATION METHODS:

Clearcut: N/A

Shelterwood: N/A

Seed Tree: N/A

Selection: N/A

PLANTING:

Recommended Species: N/A

Success Probability: N/A

SITE PREPARATION	INTENSITY		
Method	High	Moderate	Low
Mechanical	H	H	
Burning	N/A	N/A	N/A

REVEGETATION: After disturbance, very slow.

STOCKABILITY: .5 BUDWORM SUSCEPTIBILITY: 1.5

TSI: Not needed.

PRODUCTIVITY:

Site Index ? + + + Productivity None

Forage Value Rating (Cattle): Early Seral None Late Seral None

OTHER: Occasionally large trees are produced that can be attractive or important for wildlife habitat, snags and spiked topped trees are sometimes important for cavity nesters. Scree can be important habitat for certain rodents and herpefauna (lizards, snakes, salamanders).

Riparian Forests

Alnus tenuifolia series	123000
Populus angustifolia series	103000
Populus fremontii var wislizenii series	104000

SYN: Subseries descriptions are provided in various TES reports.

Association descriptions include Picea pungens/Cornus stolonifera (Fitzhugh et al 1987), Abies concolor/Galium triflorum (DeVelice et al 1986), Pinus ponderosa/Poa pratensis (DeVelice et al 1986), Abies concolor/Juglans major (Alexander et al 1984a).

SITE: Perennial and intermittent streamsides, all elevations, Aquic cumulic, and fluventic soils where roots reach water table and its capillary fringe.

TES: All climatic and elevational zones (5, 6, 7).

TREES: Well represented to luxuriant overstories. Any of the following are diagnostic when present. Populus fremontii, P. angustifolia, Juglans major, Acer negundo, Salix gooddingii, Fraxinus pennsylvanica var velutina, Eleagnus angustifolia.

SHRUBS: Often abundant. Any of the following are diagnostic. Salix bebbiana, Salix exigua, S. lasiandra, Alnus tenuifolia, Cornus stolonifera, Salix irrorata. Other common species can include Vitis arizonica, Parthenocissus inserta, Toxicodendron radicans, Lonicera involucrata, Salix scouleriana, Acer glabrum, Pachistima myrsinites.

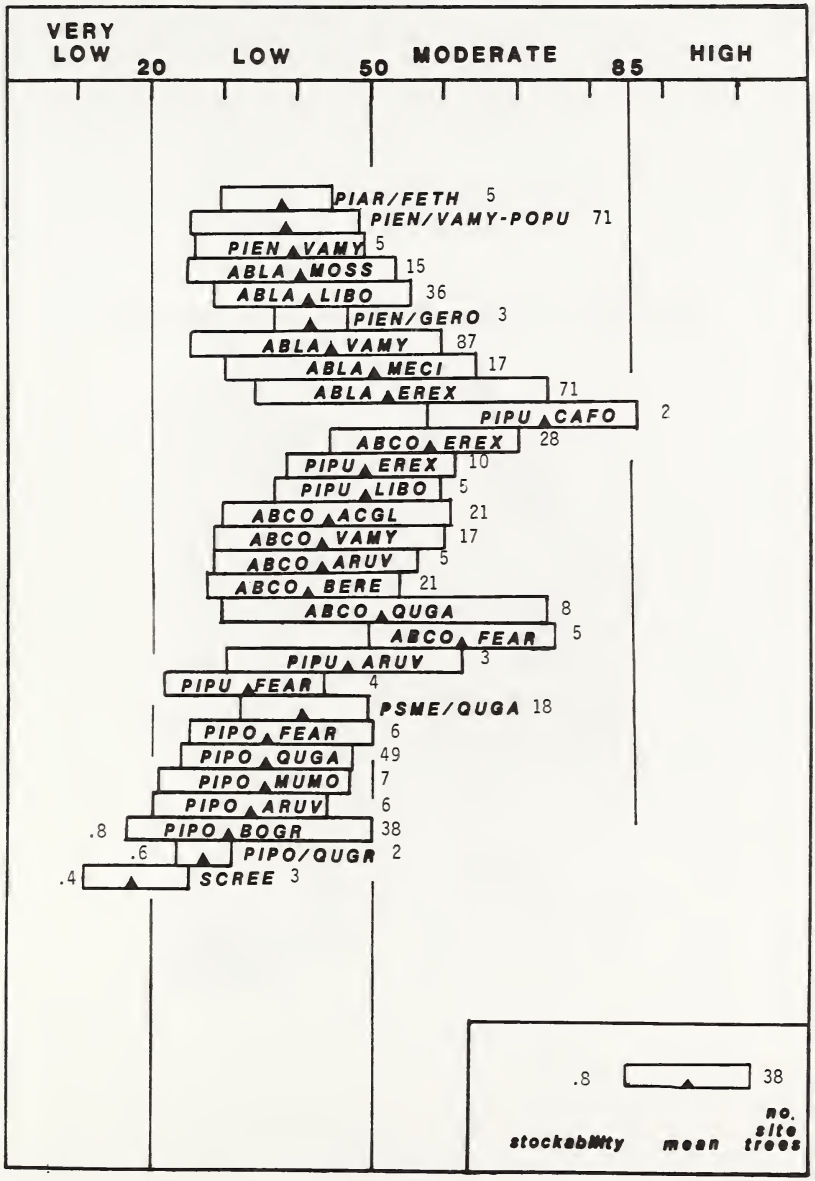
HERBS: Abundant to luxuriant. There is a highly diverse flora. Common species include Poa pratensis, Bromus spp., Rudbeckia laciniata, Agrostis gigantea, Agropyron smithii, Elymus glaucus, Heracleum spondylium, Oxypolis fendleri, Veratrum californicum, Geum allepicum, Hypericum formosum.

DIS: Widespread throughout Southwest.

ALSO SEE: USDA Forest Service, Region 3, Riparian Area Handbook.

MANAGEMENT IMPLICATIONS: Riparian forests require special standards and guidelines as stated in Forest Plans and project level prescriptions.

Northern New Mexico Yield Classes



Schizachyrium scoparium (Little bluestem)

WOODLANDS

Scarp Woodland

Chrysothamnus nauseosus (Rabbitbrush)

Scarp Woodland

1W

250000

SITE: Slopes > 40 percent with cobbly, bouldery soils having much discontinuity because of rock outcrop or bare rock exposure.

TES: 4; -1, 0, +1.

TREES: Well represented. Species composition varies with geography and elevation.

SHRUBS: Well represented. Usually numerous species are found. Composition varies with geography and elevation.

HERBS: Well represented. Numerous species of both grasses and forbs.

DIS: Widespread in Southwest and Great Plains.

ALSO SEE: QUGR/CEMO, PIED/CEMO, JUMO/QUTU, JUMO/QUUN, JUDE-JUMO/CEMO-QUGR; Wells (1970); TES mapping units with very steep slopes and rock outcrop components, such as MU 278 (Edwards 1987), MUS 105, 113, 117, 127, 133, 208 (Price 1983), and MU 74 (Gass et al 1981); Naumann (1987) divides scarp woodlands into local plant associations

COMMENTS: Steep, rough, topography limit management opportunities to wildlife, visual, and dispersed recreation rather than extractive, commodity-oriented use.

Pinus aristata/Festuca arizonica

2W

Bristlecone pine/Arizona fescue
PIAR/FEAR

238300

SITE: Steep s- or w-slopes, often adjoining grasslands, 8,600-10,500 ft.

TES: 6, 0, +1.

TREES:	ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
			c	a		c	c	C					

SHRUBS: Common. Ribes cereum, Symphoricarpos oreophius, Juniperus communis.

HERBS: Abundant. Festuca arizonica, Muhlenbergia montana, Koeleria macrantha, Erigeron spp., Artemisia franserioides, Campanula rotundifolia.

DIS: Local in n-NM and s-CO.

ALSO SEE: TES mapping units 300 and 302 for Carson National Forest (Edwards 1987); PSME/FEAR, Pinus flexilis phase occurs on similar sites in the San Francisco Peaks, AZ.

COMMENTS:

H. T.: Bristlecone pine/Arizona fescue

REGENERATION METHODS:

Clearcut: Generally favors meadows.

Shelterwood: Sometimes successful.

Seed Tree: Not usually successful.

Selection: Favors Douglas-fir or blue-spruce.

PLANTING:

Recommended Species: Bristlecone pine, blue-spruce (where appropriate).

Success Probability: Low

SITE PREPARATION:

METHOD	INTENSITY: HIGH	MODERATE	LOW
Mechanical	H	H	B
Burning	H	H	H

REVEGETATION: After disturbance, moderate to slow.

STOCKABILITY: .8 BUDWORM SUSCEPTIBILITY: 0

TSI: Not usually needed

PRODUCTIVITY:

Site Index ? + ___ + ___ + ___ Productivity ___Low___

Forage Value Rating (Cattle): Early Seral Moderate Late Seral Low

OTHER: Often an interesting and attractive habitat type because of open grassy stands and contrast in tree form between bristlecone pine and Douglas-fir or blue spruce. Cessation of grass fires contributes to tree encroachment into former meadows.

Pinus aristata/Festuca thurberi

3W

Bristlecone pine/Thurber fescue
PIAR/FETH

238310

SITE: Mid and upper slopes, often adjoining grasslands, 10,500-11,800 ft., Dystric Cryochrepts, Typic Cryoborolls, Typic Cryorthents.

TES: 7, -1, 0, +1.

TREES:	ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
	a	C						C					

SHRUBS: Scarce. Ribes montigenum, R. cereum, Symphoricarpos orcophilus, Juniperus communis, Saxifraga bronchialis.

HERBS: Abundant. Festuca thurberi*, F. arizonica, Poa fendleriana, P. pratensis, Achillea millefolium, Polemonium pulcherrimum, Campanula rotundifolia, Oreochrysum parryi.

DIS: n-NM, CO.

ALSO SEE: TES mapping unit 303 for Carson National Forest (Edwards 1987). If Festuca thurberi is scarce, see PIAR/FEAR.

COMMENTS:

H. T.: Bristlecone pine/Thurber fescue

REGENERATION METHODS:

Clearcut: Generally favors meadows.

Shelterwood: Often successful for either Engelmann spruce or bristlecone pine.

Seed Tree: Not usually successful.

Selection: Favors Engelmann spruce.

PLANTING:

Recommended Species: Bristlecone pine

Success Probability: Low

SITE PREPARATION:

METHOD	INTENSITY HIGH	MODERATE	LOW
Mechanical	H	H	B
Burning	H	H	H

REVEGETATION: After disturbance, moderate to slow.

STOCKABILITY: .8 BUDWORM SUSCEPTIBILITY: 0

TSI: Not usually needed.

PRODUCTIVITY:

Site Index ? + + + Productivity Low

Forage Value Rating (Cattle): Early Seral Moderate Late Seral Low

OTHER: Often an interesting and attractive habitat type because of open grassy stands, distinctive form of bristlecone pine, and contrasts in tree form between bristlecone pine and spire-like crowns of Engelmann spruce. Cessation of grass fires contributes to tree encroachment into the meadows.

Pinus aristata/Ribes montigenum

4W

Bristlecone pine/Mountain current 238040
PIAR/RIMO

SITE: Scree and cobbly soils, 10,500-11,500 ft., ridgetops and dry, exposed sites.

TES: 7, 0, +1.

TREES:	ABLA	PIEN	PIPU	POTR	ABCO	PSME	PIFL	PIAR	PIPO	PIED	JUSC	JUMO	QUGA
		c					c	C					

SHRUBS: Well represented. Ribes montigenum, Saxifraga bronchialis, Juniperus communis.

HERBS: Scarce. Penstemon whippleanus, Festuca brachyphylla, Thlaspi fendleri, Senecio atratus, Trifolium dasyphyllum.

DIS: n-AZ, UT, n-NM, CO.

ALSO SEE: Scree forest (DeVelice et al 1986), Rominger and Paulik (1983), Pinus aristata/Trifolium dasyphyllum h.t. (Hess and Alexander 1986).

MGT: Stands have scenic appeal, and old trees record past climatic variables as tree-ring widths.

COMMENTS:

Pinus edulis/Andropogon hallii

5W

Pinyon pine/Sand bluestem
PIED/ANHA

204300

SITE: Valley plains with deep, sandy soils (Typic Ustipsamments).

TES: 4, -1 HSC, LSC.

TREES: Well represented. Pinus edulis and Juniperus monosperma.

SHRUBS: Often well represented. Artemisia filifolia, Artemisia tridentata (LSC climate), Yucca elata, Rhus trilobata, Chrysothamnus spp.

HERBS: Well represented. Andropogon hallii*, Muhlenbergia pungens*, Andropogon scoparium (Schizachyrium scoparius), Bouteloua gracilis, Sporobolus cryptandrus, Sporobolus contractus, Erysimum repandum, Oryzopsis hymenoides.

DIS: Local in c- and n-NM.

ALSO SEE: TES mapping unit 153 in the Carson National Forest (Edwards 1987).

COMMENTS:

Pinus edulis/Arctostaphylos pungens

6W

Pinyon pine/Manzanita
PIED/ARPU

204400

SITE: Steep slopes of canyon walls, elevated plains, and benchs, 5,000-8,000 feet; stony soils derived from limestone or sandstone.

TES: 4, 0 LSM.

TREES: Well represented. Pinus edulis, Juniperus osteosperma.

SHRUBS: Abundant. Arctostophylus uva-ursi*, Quercus turbinella, Garrya flavescens, Artemisia tridentata, Glossopetalon nevadense, Cercocarpus montanus, Gutierrezia sarothrae, Yucca baccata, Rhus trilobata, Agave utahenses.

HERBS: Scarce to common.

DIS: Grand Canyon National Park north of Colorado River from Shivwits Plateau to Naukoweap Valley.

ALSO SEE: Pinus fallax/Arctostaphylos pungens (USDA Forest Service 1986b); Pinus edulis-Quercus turbinella-Arctostaphylus pungens association (Warren et al 1982).

COMMENTS:

Pinus edulis/Artemisia tridentata

7W

Pinyon pine/Big sage
PIED/ARTR

Juniperus osteosperma phase 204010
Juniperus monosperma phase 204011
Juniperus scopulorum phase 204012

SYN: Pinus edulis-Juniperus osteosperma/Artemisia tridentata (Johnston 1984)

SITE: MAP = 16 in/yr (Erdman et al 1969); highly variable soils and topography between 6000-7400 ft.

TES: 4, 0 LSC.

TREES: Well represented. Pinus edulis in association with junipers, depending on geography.

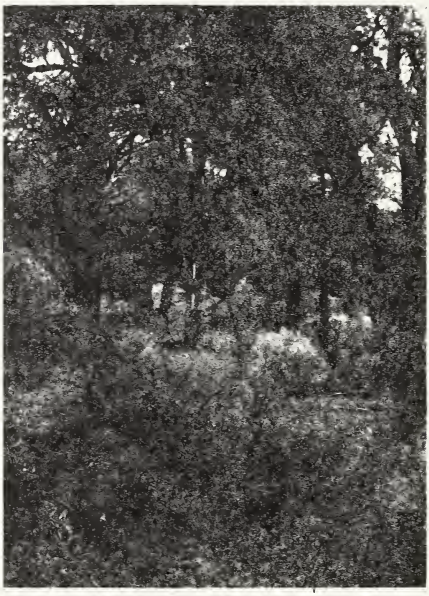
SHRUBS: Common to abundant. Artemisia tridentata*, Atriplex canescens, Lycium pallidum, Yucca baccata, Chrysothamnus nauseosus, C. depressus, Ephedra viridis, Gutierrezia sarothrae, Opuntia whippleanus, O. polyacantha.

HERBS: Well represented. Poa fendleriana, Koeleria macrantha, Sitanion hystrix, Stipa comata, S. neomexicana, S. speciosa, Oryzopsis micrantha, O. hymenoides, Agropyron smithii, Muhlenbergia torreyi, Hilaria jamesii, Bouteloua gracilis, Phlox spp. Annual grasses, mostly of the genus Bromus, are common on grazed sites or disturbed soil.

DIS: JUOS phase from sw-CO and s-UT into n-AZ and nc-NM; JUMO and JUSC phases from nc-NM into s-CO.

ALSO SEE: Erdman (1970); Erdman, Douglas, and Marr (1969); Jameson et al (1962), Schmutz et al (1967); TES mapping units 142, 145, 151, 153, and 194 on Carson National Forest (Edwards 1987); TES mapping units 206, 207, 220, 214, and 643 on Santa Fe NF (Gass et al 1981, Price 1983); Juniperus osteosperma-Pinus edulis-Artemisia tridentata association (Warren et al 1982).

COMMENTS: Succession has beem described by Erdman (1970).



Pinyon pine/Big sage

Habitat Type (7W)

Pinus edulis/Bouteloa gracilis

8W

Pinyon pine/Blue grama
PIED/BOGR

Hill slope phase	204024
Juniperus osteosperma phase	204021
Juniperus monosperma phase	204022

SITE: Valley and elevated plains, piedmont slopes, mountain slopes; 6300-7500 ft (lower or higher depending on aspect and soils); wide variety of soil and parent materials; MAP = 15-18 in/yr. The hill slope phase usually occurs on slopes > 15 percent.

TES: 4, 0, +1 (mostly HSC)

TREES: Abundant to luxuriant. Pinus edulis, Juniperus monosperma, Juniperus osteosperma.

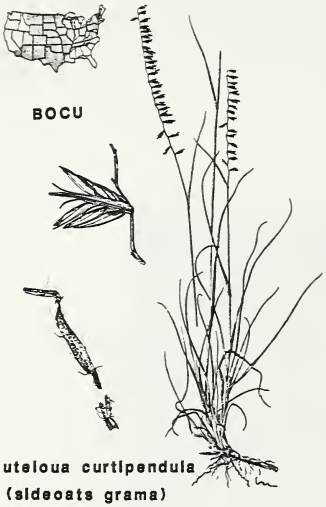
SHRUBS: Scarce to common. Rhus trilobata, Cercocarpus montanus, Gutierrezia sarothrae, Chrysothamnus, Quercus undulata, Opuntia imbricata, O. polyacantha, O. phaeacantha, Cowania mexicana (<1-2 percent cover), Artemisia tridentata (<1 percent cover), Yucca elata, Lycium pallidum.

HERBS: Abundant, especially grasses. Bouteloua gracilis, B. curtipendula, B. eriopoda, Hilaria jamesii, Oryzopsis micrantha, Poa fendleriana, Koeleria macrantha, Sitanion hystrix, Stipa spp., Muhlenbergia torreyi, Artemisia frigida, Lycurus phleoides, Aristida spp., Schizachyrium scoparium, Agropyron smithii.

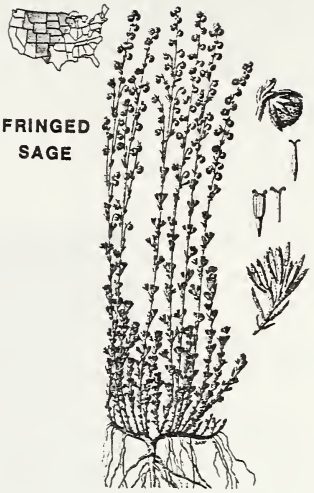
DIS: Widespread in NM, AZ, s-CO, s-UT.

ALSO SEE: Pinus edulis-Juniperus monosperma/Bouteloua gracilis (Kennedy 1983), Pinus edulis-Juniperus deppeana/Bouteloua gracilis (Kennedy 1983), Dick-Peddie et al 1984, Francis (1986). Mapping units 118, 159, and 195 (hill slope phase) of Edwards (1987); hill slope phases on the Coyote RD (Santa Fe NF) can be found in TES mapping units 143, 215, and 216 (Price 1983). See Barnes (1987) for comparisons between PIED/BOGR, PIED/POFE, and JUMO/BOCU near Los Alamos, NM. The hill-slope phase grades into JUMO/BOCU or JUMO/BOGR on drier, warmer sites.

PIED/POFE (14W) may key to PIED/BOGR. However PIED/BOGR has scarce Muhlenbergia montana, and cool season grasses are less frequent.



Bouteloua curtipendula
(sideoats grama)



Artemisia frigida

Schizachyrium scoparium (Little bluestem)

Pinus edulis/Cowania mexicana

9W

Pinyon pine/Cliffrose
PIED/COME

COME phase 204320
ARTR phase 204321

SITE: Plains or hill slopes, 6,000-6,800 ft., often Lithic Haplustolls or Lithic Ustochrepts on calcareous parent materials; MAP 14-16 in.

TES: 4, 0 HSC (COME phase); 4,0 LSC (ARTR phase)

TREES: Well represented. Pinus edulis, Juniperus osteosperma.

SHRUBS: Well represented. Cowania mexicana*, Chamaebatiaria millefolium, Quercus gambelii, Berberis trifoliata, Cercocarpus montanus, Yucca baccata, Artemisia tridentata (ARTR phase), Ephedra viridis, Opuntia spp.

HERBS: Well represented. Bouteloua gracilis, B. curtipendula, Stipa comata, S. neomexicana, Andropogon scoparius, Poa fendleriana, Koeleria macrantha, Sitanion hystrix, Polygala alba, Penstemon linarioides, Artemisia frigida, A. ludoviciana, Calliandra humilis.

DIS: c- and n-AZ into UT and sw-CO; local in w-NM.

ALSO SEE: PIED/BOGR if shrubs are poorly represented; PIED/QUGA if Quercus gambelii > 5 percent cover; mapping unit 52 in Nelson and Redders (1982); Pinus edulis-Juniperus osteosperma-Artemisia tridentata-Cowania mexicana association (Warren et al 1982)

COMMENTS: For taxonomy and hybridization of Cowania, see McArthur et al (1983)

Pinus edulis/Coleogyne ramosissima

10W

Pinyon pine/Blackbrush
PIED/CORA

204410

SITE: Elevated plains and benches, 3,500-6,200 ft.; usually shallow (lithic), stony soils developed from a wide variety of parent materials.

TES: 4, O, LSC.

TREES: Well represented. Pinus edulis, Juniperus Osteosperma.

SHRUBS: Well represented or abundant. Coleogyne ramosissima*, Mortonia scabrella*, Glossopetalon nevadense, Cercocarpus montana, Quercus turbinella, Gutierrezia sarothrae, Atriplex canescens, Cowania stansburiana (McArthur et al 1983), Thamnosma montana, Agave utahensis, Yucca baceata.

HERBS: Common. Stipa speciosa, Sitanion hystrix, Poa fendleriana, Koeleria macrantha, Agropyron smithii, Bouteloua curtipendula, B. eriopoda, Aristida spp., Bromus rubens, Psilotrophe sparsiflora.

DIS: Grand Canyon National Park, AZ.

ALSO SEE: Coleogyne ramosissima-Pinus edulis-Juniperus osteosperma and Mortonia scabrella-Pinus edulis-Gutierrezia associations of Warren et al (1982).

COMMENTS:

Pinus edulis/Chrysothamnus nauseosus - Fallugua paradoxa

11W

Pinyon pine/Rabbitbrush-Apache plume; PIED/CHNA-FAPA 204330

SITE: Intermittent washes and river terraces, 6,300-7,500 ft.; common soils include Typic Ustifluvents, Fluventic Haplustolls, and Fluventic Ustochrepts. These are often incised with arroyos or gullies. Also found on deep cindery soils. Site specific determination of soils may be required.

TES: 4, 0 and 4, +1.

TREES: Common or well represented. Pinus edulis, Juniperus spp.; infrequent Populus angustifolia in some areas.

SHRUBS: Abundant. Chrysothamnus nauseosus var. graveolens, Fallugia paradoxa, Atriplex canescens, Artemisia tridentata, Brickellia californica, Gutierrezia sarothrae.

HERBS: Well represented. Bouteloua gracilis, B. curtipendula, Agropyron smithii, and numerous other grasses and forbs.

DIS: Widespread in NM and AZ but very local in the landscape.

ALSO SEE: Mapping unit 71 in TES for Carson National Forest (Edwards 1987). If cottomwoods are common, see riparian forests.

COMMENTS: Periodic flooding, arroyo cutting, and sustained livestock grazing can weaken the tree and perennial grass components and increase the importance of shrubs and annuals.

Pinus Edulis/Cercocarpus montanus

Pinyon pine/Mountain mahogany
PIED/CEMO

Quercus undulata phase 204031
Quercus gambelii phase 204033

SITE: Mostly steep and moderately steep slopes from 6,700-7,500 ft.; often Udic and Lithic Ustochrepts; MAP about 18 in/yr, mean annual air temperature about 53 F.

TES: 4, 0,+1.

TREES: Well represented. Pinus edulis, Juniperus scopulorum, Juniperus monosperma (lower elevation sites), Juniperus osteosperma.

SHRUBS: Often abundant. Cercocarpus montanus, C.m. var. paucidentata, Rhus trilobata, Amelanchier spp., Berberis haematocarpa, Quercus undulata, Q. gambelii, Fendlera rupicola, Yucca baccata.

HERBS: Common or well represented, but much less important than shrubs. Bouteloua curtipendula, B. gracilis, B. hirsuta, Andropogon scoparium, Muhlenbergia pauciflora, Lycurus phleoides.

DIS: se-AZ, NM, s-CO.

ALSO SEE: Pinus edulis-Juniperus osteosperma/Amelanchier utahensis-Cercocarpus montanus (Johnston 1984); Pinus edulis-Juniperus monosperma/Cercocarpus montanus/Andropogon gerardi (Kennedy 1983); TES mapping unit 105 in Cuba and Coyote Ranger Districts, Santa Fe National Forest (Gass et al 1981, Price 1983).

COMMENTS: Excellent habitat for wildlife browse and winter range.

Pinus edulis/Festuca arizonica

13W

Pinyon pine/Arizona Fescue
PIED/FEAR

204310

SITE: Adjoins Pinus ponderosa forests; MAP = 18 in/yr.

TES: 4, +1.

TREES: Abundant. Pinus edulis with minor cover by Juniperus monosperma or J. osteosperma.

SHRUBS: Scarce.

HERBS: Well represented. Festuca arizonica*, Muhlenbergia montana, Koeleria macrantha, Poa fendleriana, Blepharoneuron tricholepis, Bouteloua gracilis. Forbs are minor.

DIS: n-AZ; local in NM (MT Taylor RD, Cibola NF).

ALSO SEE: PIED/POFE and PIED/STCO3 are very similar; for description in Grand Canyon National Park, AZ, see Merkle (1957).

COMMENTS:

Pinus edulis/Poa fendleriana

14W

Pinyon pine/Muttongrass
PIED/POFE

204060

SYN: Pinus edulis-Juniperus osteosperma/Poa fendleriana (Johnston 1984); Pinus edulis-Juniperus monosperma/mixed shrub/Muhlenbergia montana. (Barnes 1987)

SITE: MAP = 18 in/yr and mean annual air temperature = 47 deg. F. In the Jemez Mts., NM, elevations are around 6500-7100 ft., on n- and e-slopes (Barnes 1987); s-facing slopes to 8400 ft. in Sandia Mts.

TES: 4, +1 (mostly LSC).

TREES: Abundant to luxuriant. Pinus edulis (C), Juniperus osteosperma (C), J. monosperma and J. scopulorum (c, depending on geography).

SHRUBS: Scarce to common. Yucca angustissima, Y. baccata, Opuntia polyacantha. Artemisia tridentata (< 1 percent cover), Cercocarpus montana, Fallugia paradoxa (granitic soils).

HERBS: Well represented to abundant especially grasses. Poa fendleriana, Koeleria macrantha, Muhlenbergia montana, Aristida fendleriana, A. longiseta, Oryzopsis micrantha, Blepharoneuron tricholepis, Agropyron smithii, Bouteloua gracilis, Stipa spp. Forbs are minor but can increase on disturbed sites. Mertensia macdougalii, Artemisia ludoviciana, Lotus wrightii, Phlox spp., Hymenopappus lugens, Mirabelis multiflora.

DIS: n-AZ, s-UT, sw-CO, n-NM (Sandia Mts, Chuska Mts, etc)

ALSO SEE: If Festuca arizonica is common, see PIED/FEAR; PIED/POFE is closely related to PIED/STCO3. If Artemisia tridentata is common, see PIED/ARTR. In Colorado see Johnston (1984), Erdman, Douglas, and Marr (1969). In NM see TES mapping unit 194 (Edwards 1987), 203, 204, 205 (Price 1983), and 78, 208 (Gass et al 1981).

COMMENTS: For comparison between PIED/POFE, PIED/BOGR, and JUMO/BOCU in Jemez Mts., (Los Alamos), NM, see Barnes (1987). Overgrazed sites of PIED/POFE can lack cool season grasses and may resemble PIED/BOGR (8W).

Pinyon pine/Muttongrass

Habitat Type (14W)

Pinus edulis/Purshia tridentata

15W

Pinyon pine/Bitterbrush
PIED/PUTR

204050

SYN: Pinus edulis-Juniperus osteosperma/Purshia tridentata (Johnston 1984).

SITE: Mesas and scarps, 6,900-7,500 ft.; San Jose Formation.

TES: 4, +1.

TREES: Well represented or abundant. Pinus edulis (C), Juniperus osteosperma (C), Quercus gambelii (s).

SHRUBS: Well represented. Purshia tridentata*, Amelanchier utahensis, Yucca baccata, Ribes cereum, Cercocarpus montanus, Artemisia tridentata (< 1% cover), Ephedra viridis.

HERBS: Scarce or common. Poa fendleriana, Koeleria macrantha, Carex rossii, Oryzopsis micrantha, Eriogonum jamesii, Phlox spp.

DIS: nw-NM and sw-CO.

ALSO SEE: Pinus edulis/Artemisia tridentata if Artemisia tridentata is well represented; Erdman, Douglas, and Marr (1969). PIED/PUTR on steep mesa scarps intergrades to scarp woodland (1W); TES mapping unit 769 in Jicarilla RD, Carson NF (Edwards et al 1987).

COMMENTS: This h.t. is important winter range for deer and elk. Periodic fire may be necessary to maintain bitterbrush.

16W

Pinus edulis/Quercus gambelii

Pinyon pine/Gambel oak
PIED/QUGA

204040

SITE: Usually moderate and steep mountain slopes, 6300-7500 ft. on cool, wet sites such as draws of n-slopes; MAP about 18 in/yr, MAT about 48 F (cold winters).

TES: 4, +1.

TREES: Abundant. Pinus edulis, Quercus gambelii (S), Juniperus monosperma (s), Pinus ponderosa (a), Juniperus scopulorum.

SHRUBS: Well represented. Quercus gambelii (shrub form), Symphoricarpos oreophila, Cercocarpus montana, Quercus undulata, Fendlera rupicola, Prunus spp, Rosa spp., Artemisia tridentata, Amelanchier utahensis.

HERBS: Common or well represented. Poa fendleriana, Koeleria macrantha, Muhlenbergia montana, Carex rossii, Sitanion hystrix, Bouteloua gracilis, Geranium caespitosum, Vicia americana, Achillea millefolium, Senecio neomexicanus.

DIS: Local in s-NM becoming more widespread in c- and n-NM.

ALSO SEE: TES mapping units 119, 140, 157, and 195 in Carson NF (Edwards 1987; also Johnston (1984) in CO and Warren et al (1982) Pinus edulis-Amelanchier utahensis-Quercus gambelii assoc. in Grand Canyon NP.

COMMENTS: This woodland can form a closed canopy (luxuriant tree cover) in prolonged cessation of disturbances such as fire (postclimax).

Pinus edulis/Quercus undulata 17W

Pinyon pine/Wavyleaf oak 204360
PIED/QUUN

SITE: Moderate and steep mountain slopes, 6,000-7,000 ft.; often lithic skeletal soils.

TES: 4, 0.

TREES: Well represented or abundant. Pinus edulis, Juniperus deppeana. Juniperus monosperma.

SHRUBS: Abundant. Quercus undulata, Berberis haematocarpa, Fendlera rupicola, Garrya wrightii, Rhus trilobata, Cerocarpus montanus, Yucca baccata, Prunus spp.

HERBS: Common. Numerous species of grasses and forbs, but none are more than 5 percent cover.

DIS: s- to c-NM; local in n-NM.

ALSO SEE: PIED/MUDU, PIED/STCO3, and PIED/MUPA all contain Quercus undulata but this oak seldom exceeds about 15 percent cover in mature stands. Wavyleaf oak is a vigorous sprouter after fire or clearing, and early successional stages of these different h.t.s may be difficult to separate. See Naumann's (1987) Pinus edulis-Juniperus monosperma/Quercus undulata/(Schizachyrium scoparium phase).

COMMENTS:

Pinus edulis/Rockland

18W

Pinyon-pine/Rockland
PIED/ROCKLAND

204350

SITE: Lava flows (malpais) or soils < 4 inches to bedrock.

TES: 4, 0, +1.

TREES: Well represented, often rooted in fissures. Pinus edulis, Juniperus deppeana, J. monosperma.

SHRUBS: Common to well represented. Fallugia paradoxa, Atriplex canescens, Opuntia spp., Rhus trilobata, Ephedra viridis, Quercus turbinella, Glossopetalon nevadense (in AZ).

HERBS: Scarce or common. Composition is highly variable.

DIS: Zuni Mountains, NM, Peloncillo Mountains, NM, scattered locations elsewhere in NM and AZ.

ALSO SEE: Lindsey (1951); Pinus edulis-Juniperus osteosperma-Quercus turbinella-Cercocarpus intricatus assoc. in Grand Canyon NP (Warren et al 1982)

COMMENTS:

Pinus edulis/Sparse community type

19W

Pinyon pine/Sparse
PIED/SPARSE

204500

SITE: Often between 6500-7300 ft. on basaltic mesas or hill slopes; soils are highly variable, and on-site determination may be required (see comments).

TES: 4, 0.

TREES: Abundant. Pinus edulis, Juniperus osteosperma, J. deppeana, occasionally J. monosperma.

SHRUBS: Scarce or common. Rhus trilobata, Opuntia spp.

HERBS: Perennial herbs are scarce, annuals may be common to well represented or even abundant.

DIS: Widespread especially in AZ and sw-NM; local in n-NM and n-AZ.

ALSO SEE: Dalen and Snyder (1986). On soils derived from sandstone and gypsum see TES mapping unit 106 (Santa Fe NF, Gass et al 1981, Price 1983).

COMMENTS: This community type is derived from woodlands with a history of livestock grazing, soil erosion, and fire cessation. It may be an advanced successional stage from several habitat types, as well as a prolonged successional stage (disclimax) under current soil and management conditions. Erosional "badlands" represent PIED/SPARSE as a natural plant association.

Pinus edulis/Stipa columbiana

20W

Pinyon pine/Western needle grass
PIED/STC03

204370

SYN: Pinus edulis-Juniperus monosperma/Stipa columbiana (Kennedy 1983).

SITE: Moderate to gentle slopes, 6,200-7,300 ft.

TES: 4, 0.

TREES: Well represented to abundant. Pinus edulis (C), Juniperus monosperma (S), Juniperus deppeana (a).

SHRUBS: Scarce to common. Quercus undulata, Rhus trilobata.

HERBS: Well represented to abundant. Bouteloua gracilis, Bouteloua curtipendula, Muhlenbergia montana, Stipa columbiana, S. schribneri, Sitanion hystrix, Schizachyrium scoparium (Andropogon scoparium), Oryzopsis micrantha, Andropogon gerardi, Lithospermum multiflorum.

DIS: Sacramento and Jicarilla Mts to as far north as Rowe Mesa (Pecos Range Districts, Santa Fe National Forest).

ALSO SEE: PIED/MUPA and PIED/STC03 are very similar and may be related successionally (see Kennedy 1983).

COMMENTS:

Juniperus monosperma/Andropogon hallii

21W

One-seed juniper/Sand bluestem
JUMO/ANHA

201340

SITE: Valley plains with deep, sandy soils (Typic Ustipsamments).

TES: 4, -1 HSC, LSC.

TREES: Well represented. Juniperus monosperma.

SHRUBS: Usually scarce, but sometimes well represented. Artemisia filifolia, Artemisia tridentata (LSC climate), Yucca elata, Dalea scoparia*, Rhus trilobata, Chrysothamnus spp.

HERBS: Well represented. Andropogon hallii*, Muhlenbergia pungens*, Andropogon scoparium (Schizachyrium scoparius), Bouteloua gracilis, Sporobolus cryptandrus, Sporobolus contractus, Erysimum repandum, Oryzopsis hymenoides.

DIS: Local in c- and n-NM.

ALSO SEE: TES mapping units 143 and 144, Carson National Forest (Edwards 1987).

COMMENTS:

One-seed juniper/Sand bluestem

Habitat Type (21W)

Juniperus monosperma/Artemisia bigelovii

22W

One-seed juniper/Bigelow sage
JUMO/ARBI

201350

SYN:

SITE: Limestone mesas and hillslopes; very shallow, rocky soils (Lithic Ustochrepts and Lithic Ustorthents), 5,000-7,000 ft.; MAP about 14 in/yr.

TES: 4, -1.

TREES: Well represented (cover < 10 percent). Juniperus monosperma (C), Pinus edulis (a).

SHRUBS: Well represented. Artemisia bigelovii*, Atriplex canescens, Ceratioides lanata, Berberis fremontii, Ephedra spp.

HERBS: Well represented. Bouteloua gracilis, B. eriopoda, Aristida spp., Lycurus phleoides, Stipa comata, Stipa neomexicana, Zinnia grandiflora.

DIS: Local in n-AZ, n-AZ, and possibly s-UT and sw-CO.

ALSO SEE: PIED/ROCKLAND.

COMMENTS: Good winter range for deer and elk.

Juniperus monosperma/Artemisia tridentata

23W

One-seed juniper/Big sagebrush
JUMO/ARTR

201040

SITE: Elevated and piedmont plains, 6,600-6,800 ft.; MAP = 14 in/yr. A wide variety of soils include calcareous Typic Ustochrepts and Aridic Haplustalfs (consult TES reports and verify on-site soils.)

TES: 4, -1, LSC.

TREES: Well represented. Juniperus monosperma (cover to about 10 percent).

SHRUBS: Well represented. Artemisia tridentata*, Gutierrezia sarothrae, Opuntia polyacantha, Atriplex canescens, Hymenoxys richardsonii, Chrysothamnus nauseosus.

HERBS: Well represented. Hilaria jamesii, Sporobolus cryptandrus, S. airioides, Oryzopsis hymenoides, Sitaniun hystrix, Agropyron smithii, Leucelene ericoides, Aristida longiseta, Aristida fendleriana, Bouteloua gracilis, B. hirsuta, B. curtipendula, Eriogonum jamesii, Stipa neomexicana.

DIS: n-NM.

ALSO SEE: Juniperus monosperma/Artemisia tridentata/Hilaria jamesii-Sporobolus cryptandrus plant community (Francis 1986); JUOS/ARTR; TES mapping unit 111 for Santa Fe NF (Price 1983) and mapping unit 143 for Carson NF (Edwards 1987).

COMMENTS: Sporobolus airioides and Agropyron smithii may be indicative of clayey soils (Alfisols), whereas Bouteloua curtipendula and other grasses may suggest non-clayey soils (Inceptisols or Entisols) Livestock grazing can result in higher density or cover of Gutierrezia sarothrae, Hymenoxys, Bouteloua gracilis, or Chrysothamnus nauseosus.

Juniperus monosperma/Bouteloua curtipendula

One-seed juniper/Sideoats grama 201010
JUMO/BOCU

SITE: 5500-6400 ft., often on s-aspects (Jemez mts., NM), typically escarpments, hill- or mountainslopes > 15 percent; soils stony or rocky, often interrupted by rock outcrop, wide variety of parent materials.

TES: 4, -1.

TREES: Abundant. Juniperus monosperma (C), Pinus edulis (a or c).

SHRUBS: Common to well represented. Rhus trilobata, Artemisia tridentata (< 1%), Cercocarpus montanus, Quercus undulata, Gutierrezia sarothrae, Opuntia imbricata.

HERBS: Common to well represented. Bouteloua gracilis, B. curtipendula, B. hirsuta, B. eriopoda, Hilaria jamesii, Muhlenbergia pauciflora, Andropogon scoparius, Lycurus phleoides, Poa fendleriana, Stipa spp., Mirabelis multiflora, Eriogonum jamesii, Erigeron nudiflorus.

DIS: Reported from Jemez Mts., NM, into s-CO (Barnes 1987, Johnston 1984); doubtless more widespread.

ALSO SEE: Scarp woodland on steep, rocky slopes; JUMO/BOGR on gentle slopes where sedimentation tends to be depositional.

COMMENTS:

Juniperus monosperma/Bouteloua gracilis

One-seed juniper/Blue grama
JUMO/BOGR

201020

SITE: Usually valley plains and piedmont alluvial fans, 5,500-7,000 ft.; wide variety of soils and parent materials; MAP = 14-16 in/yr.

TES: 4, -1.

TREES: Well represented. Juniperus monosperma, Pinus edulis (a).

SHRUBS: Scarce. On grazed ranges shrubs are well represented, including Gutierrezia sarothrae, Chrysothamnus spp., Opuntia spp.

HERBS: Abundant or luxuriant. Bouteloua gracilis, Bouteloua eriopoda, Hilaria jamesii, Aristida fendleriana, A. longiseta, Sporobolus cryptandrus, Sitanion hystrix, Poa fendleriana, Koeleria macrantha, Stipa spp., Muhlenbergia torreyi, Eriogonum wrightii, Artemisia frigida, Sphaeralcea, Leucelene ericoides, Hymenoxys richardsonii, H. lugens, Psoralea tenuiflora.

DIS: Widespread in NM and AZ, s-CO.

ALSO SEE: Dick-Peddie et al (1984), Francis (1986), Johnsen (1962); Blue grama-cholla-juniper association in New Mexico Environmental Inst. (1971); TES mapping units 143 and 168 in Carson National Forest, and 112 in Santa Fe National Forest (Edwards 1987, Price 1983).

COMMENTS: Juniperus osteosperma/Bouteloua gracilis (JUOS/BOGR) is similar to JUMO/BOGR. More data are needed before the two habitat types are better distinguished. At present separation of JUMO/BOGR and is mostly geographical.

Juniperus monosperma/Ceratoides lanata

26W

One-seed juniper/Winterfat
JUMO/CELA

201400

SITE: Valley plains, 6,000-6,500 ft.; calcareous soils.

TES: 4, -1.

TREES: Well represented. Juniperus monosperma.

SHRUBS: Well represented. Ceratoides lanata*, Atriplex canescens, Opuntia imbricata, Rhus trilobata, Yucca elata, Gutierrezia sarothrae.

HERBS: Well represented or abundant. Bouteloua gracilis, Sporobolus cryptandrus, S. contractus, Oryzopsis hymenoides, Sitanion hystrix, Stipa neomexicana, Hilaria jamesii, Muhlenbergia torreyi, Sphaeralcea spp., Leucelene ericoildes.

ALSO SEE:

COMMENTS:

Juniperus monosperma/Chrysothamnus nauseosus - fallugia paradoxa

27W

One-seed juniper/Rabbitbrush-Apache plume 201330
JUMO/CHNA-FAPA

SITE: Intermittent washes and river terraces, 5,000-6,500 ft., common soils are Typic Ustifluvents, Fluventic Haplustolls, and Fluventic Ustochrepts (see TES reports and verify on-site soils). The soils are often cut by gullies and arroyos.

TES: 4, -1.

TREES: Common or well represented. Juniperus monosperma, J. scopulorum, infrequent or rare Populus angustifolia. Juniperus osteosperma may be the dominant tree in n-AZ.

SHRUBS: Abundant. Chrysothamnus nauseosus var. graveolens, Fallugia paradoxa, Artemisia tridentata, Atriplex canescens, Brickellia californica, Gutierrezia sarothrae.

HERBS: Well represented. Numerous species of grasses and forbs including Bouteloua gracilis, B. curtipendula, Muhlenbergia porteri, Agropyron smithii, and Astragalus flavus.

DIS: Widespread in NM and AZ but very local in the landscape.

ALSO SEE: Shrub riparian in Dick-Peddie et al (1984); mapping unit 34 in Carson National Forest (Edwards et al 1987); Chrysothamnus nauseosus series if trees are scarce (Moir 1983); PIED/CHNA-FAPA (11W) if Pinus edulis is common.

COMMENTS: Highly disturbed habitat type, both by man and hydrologic forces. Arroyo cutting and lowered water tables can reduce or eliminate the potential for cottonwoods (Populus angustifolia). Fallugia paradoxa is an indicator of excessive drainage (e.g., deep gravelly soils).

Juniperus monosperma/Quercus undulata

28W

One-seed juniper/Wavyleaf oak 201360
JUMO/QUUN

SITE: Rocky slopes between 15-40 percent gradient, intergrading to scarp woodland with increasing steepness and rock outcrop terrain. 6,000-6,500 ft.

TES: 4, -1.

TREES: Well represented. Juniperus monosperma of low stature (<16 ft.).

SHRUBS: Abundant. Quercus undulata, Q. turbinella, Fallugia paradoxa, Atriplex canescens, Nolina microcarpa, Dalea formosa, Opuntia imbricata, Opuntia spp., Cercocarpus breviflorus, Yucca spp., Lycium pallidum, Ephedra viridis.

HERBS: Common. Bouteloua curtipendula, Bouteloua spp., Muhlenbergia porteri, M. pauciflora, Stipa spp., Sitanion hystrix, Eragrostis intermedia, Artemisia spp.

DIS: c- and s-NM; local in n-NM.

ALSO SEE: New Mexico Environmental Inst. (1971): Juniper-oak breaks and Juniper associations; Martin, Fletcher, and Knight (1981); Naumann (1987). Otherwise a poorly described chaparral woodland association.

COMMENTS:

Juniperus osteosperma/Artemisia tridentata

29W

Utah juniper/big sagebrush
JUOS/ARTR

202020

SITE: Elevations between 5,500-7,000 ft. from nearly level to steeply sloping piedmont plains; MAP 10-14 in/yr, much of this as winter snow; soils often on gullied alluvium.

TES: 4, -1 LSC.

TREES: Well represented but cover usually < 15 percent. Juniperus osteosperma occasionally mixed with J. monosperma.

SHRUBS: Well represented. Artemisia tridentata*, Artemisia arbuscula, Atriplex canescens, Cowania mexicana, Gutierrezia sarothrae, Opuntia spp., Hymenoxys richardsonii.

HERBS: Well represented to abundant, especially grasses. Bouteloua gracilis, B. hirsuta, B. curtipendula, Hilaria jamesii, Aristida spp, Agropyron smithii, Sitanion hystrix, Oryzopsis hymenoides.

DIS: n-AZ, n-NM to sw-CO, UT, NV, WY.

ALSO SEE: TES mapping unit 111 on Santa Fe NF (Price 1983). JUMO/ARTR (23W) is very similar. Some of the JUOS communities described in s-NV by Blackburn, Tueller, and Eckert (1969) can probably be assigned to this association.

Juniperus osteosperma-J. Monosperma/Sparse community type

30W

Juniper/Sparse c.t. (h.t.)
JUOS-JUMO/SPARSE c.t. (h.t.)

202500

SITE: 5,000-6,400 ft. often adjoining grasslands of valley plains or piedmont slopes; MAP = 14-16 in/yr. but as low as 12 in/yr. wide variety of soils and parent materials. See comments.

TES: 4, -1.

TREES: Well represented to abundant. Juniperus osteosperma and J. monosperma.

SHRUBS: Scarce.

HERBS: Perennials are scarce. For list see JUMO/BOGR (25W).

DIS: Widespread in NM and AZ.

ALSO SEE: Johnsen (1962), Baxter (1977), Dalen and Snyder (1986); JUMO/BOGR (25W).

COMMENTS: Often Juniper/Sparse is a degraded stage of other habitat types. Where soil erosion is naturally intense, Juniper/Sparse may be a "badland" plant association, as well as on special parent materials such as gypsum. Soil and landform features are critical in helping distinguish seral or climax (potential) expressions of Juniper/Sparse.

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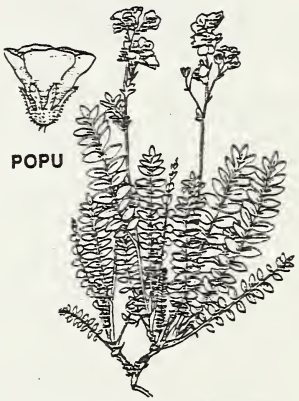
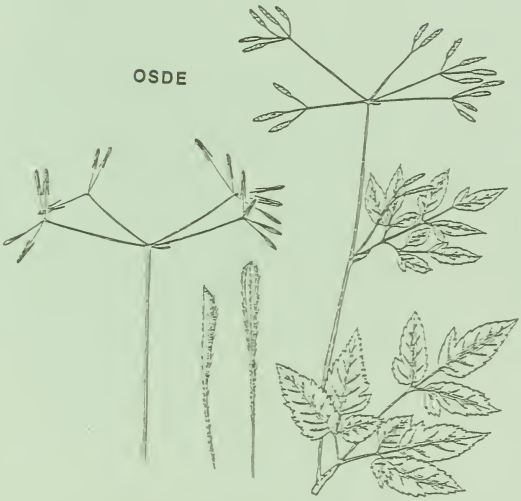


Polemonium pulcherrimum
(skunkleaf jacob's ladder)

BOTANY



Osmorhiza depauperata (sweet cicely)

Smilacina stellata
(Narrow-leaf false solomon seal)

Ramischia secunda
(one-sided wintergreen)

Acer glabrum (Rocky Mountain maple)

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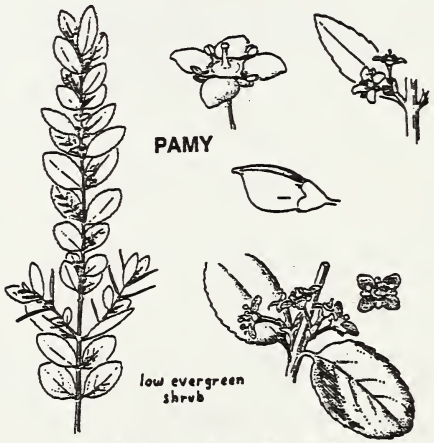


Pachistima myrsinites

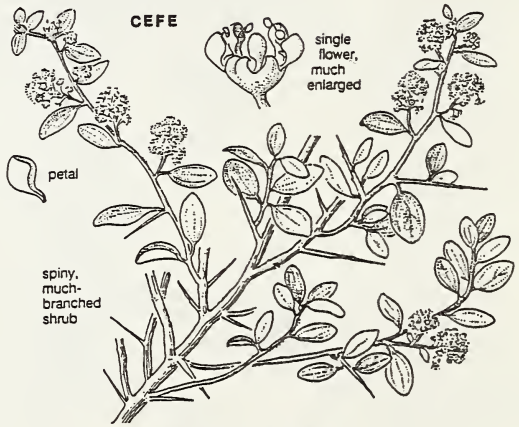
Plant Association Symbols and Names

(Alphabetical by Botanical Name)

Northern New Mexico---Northern Arizona

Symbol	Botanical Name	Common Name
ABCO	Abies concolor	white fir
ABLA	Abies lasiocarpa	subalpine fir, corkbark fir
ACGL	Acer glabrum	Rocky Mountain maple
AGSM	Agropyron smithii	western wheatgrass
ALTE	Alnus tenuifolia	thinleaf alder
ANGE	Andropogon gerardi	big bluestem
ANHA	Andropogon hallii	sand bluestem
ANSC	Andropogon scoparium (SCSC) (Schizachyrium)	little bluestem
ARARN	Artemisia arbuscula ssp nova	low sagebrush
ARBI	Artemisia bigelovii	bigelow sage
ARFI	Artemisia filifolia	sand sage
ARTR	Artemisia tridentata	big sagebrush
ARPU	Arctostaphylos pungens	manzanita
ARUV	Arctostaphylos uva-ursi	bearberry, kinnikkinik
BERE	Berberis repens	Oregon grape
BOCU	Bouteloua curtipendula	sideoats grama
BOGR	Bouteloua gracilis	Blue grama
BRCI	Bromus ciliatus	fringed brome
CACO	Cardamine cordifolia	heartleaf bittercress
CAFO	Carex foenea	foeny sedge
CELA	Ceratoides lanata	winterfat
CHNA	Chrysothamus nauseous	rabbitbrush
CORA	Coleogyne ramosissima	blackbrush
COME	Cowania stansburiana var mexicana	cliffrose
COST	Cornus stolonifera	red ozier dogwood
DASC	Dalea scoparia	sand indigobush
DAPA	Danthonia parryi	parry oatgrass
EREX	Erigeron eximius	forest fleabane
FAPA	Fallugia paradoxa	Apache plume
FEAR	Festuca arizonica	Arizona fescue
FETH	Festuca thurberi	Thurber fescue
GERO	Geum rossii	alpine avens
HODU	Holodiscus dumosus	oceanspray
JUCO	Juniperus communis	common or ground juniper
JUMO	Juniperus monosperma	one seed juniper
JUOS	Juniperus osteosperma	Utah juniper
LAAR	Lathyrus arizonica	Arizona peavine
LIBO	Linnaea borealis	twin flower

MECI	Mertensia ciliata	bluebells
MUMO	Muhlenbergia montana	mountain muhly
MUVI	Muhlenbergia virescens	screwleaf muhly
ORHY	Oryzopsis hymenoides	indian ricegrass
OXFE	Oxypolis fendleri	Fendler cowbane
PHMO	Physocarpus monogynus	Ninebark
PIEN	Picea englemannii	Englemann spruce
PIPU	Picea pungens	blue spruce
PIAR	Pinus aristata	bristlecone pine
PIED	Pinus edulis	pinyon pine
PIFL	Pinus flexilis	limber pine
PIPO	Pinus ponderosa	ponderosa pine
POAN	Populus angustifolia	narrow-leaf cottonwood
POFE	Poa fendleriana	muttongrass
POPR	Poa pratensis	Kentucky bluegrass
POPU	Polemonium pulcherrimum	Jacob's ladder
PSME	Pseudotsuga menziesii var glabrum	Douglas-fir
PUTR	Purshia tridentata	bitterbrush
QUGA	Quercus gambelii	Gambel oak
QUUN	Quercus undulata	wavyleaf oak
RIMO	Ribes montigenum	subalpine prickly current
RONE	Robinia neomexicana	New Mexico locust
RUPA	Rubus parviflorus	thimbleberry
SABC	Salix bebbiana	Bebb willow
SASC	Salix scouleriana	Forest willow
STIPA	Stipa spp.	Needlegrass, needle-and-thread
STCO3	Stipa columbiana	western needle grass
VAMY	Vaccinium myrtillus	myrtleleaf huckleberry
VASC	Vaccinium scoparium	grouse wortleberry



Ceanothus fendleri
(Fendler Ceanothus)

Conservation Resources
Lig-Free® Type I
Ph 8.5, Buffered

MECI	Mertensia ciliata	bluebells
MUMO	Muhlenbergia montana	mountain muhly
MUVI	Muhlenbergia virescens	screwleaf muhly
ORHY	Oryzopsis hymenoides	indian ricegrass
OXFE	Oxypolis fendleri	Fendler cowbane
PHMO	Physocarpus monogynus	Ninebark
PIEN	Picea englemannii	Englemann spruce
PIPU	Picea pungens	blue spruce
PIAR	Pinus aristata	bristlecone pine
PIED	Pinus edulis	pinyon pine
PIFL	Pinus flexilis	limber pine
PIPO	Pinus ponderosa	ponderosa pine
POAN	Populus angustifolia	narrow-leaf cottonwood
POFE	Poa fendleriana	muttongrass
POPR	Poa pratensis	Kentucky bluegrass
POPU	Polemonium pulcherrimum	Jacob's ladder
PSME	Pseudotsuga menziesii var glabrum	Douglas-fir
PUTR	Purshia tridentata	bitterbrush
QUGA	Quercus gambelii	Gambel oak
QUUN	Quercus undulata	wavyleaf oak
RIMO	Ribes montigenum	subalpine prickly current
RONE	Robinia neomexicana	New Mexico locust
RUPA	Rubus parviflorus	thimbleberry
SABC	Salix bebbiana	Bebb willow
SASC	Salix scouleriana	Forest willow
STIPA	Stipa spp.	Needlegrass, needle-and-thread
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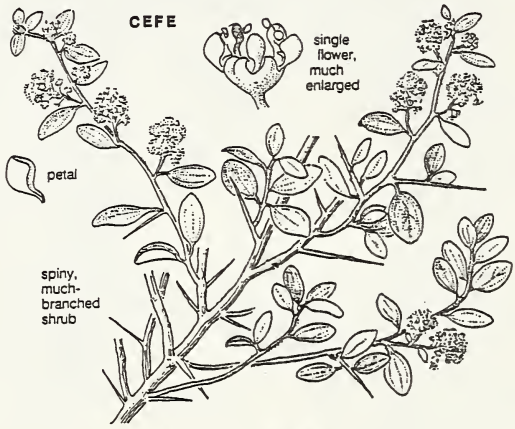

Ceanothus fendleri
(Fendler Ceanothus)

Synoptic Table of Major Vascular Plant Families

(The 38 listed families comprise about 85% of species diversity in the SW)

Dicots

Family	Common Name	Form	K	C	A	G	Fruit Type	Miscellaneous Comments
Salicaceae	willow	TS	0-x	0	2-x	(2)	cap	seeds comose, plants dioecious, flws in catkins
Polygonaceae	knotweed	HS	5 or 3+3	0	3-9	(3)	ach	calyx often petaloid, ach often triangular, lvs alternate, simple
Chenopodiaceae	goosefoot	HS	5	0	5	(2)	nutl	lvs alternate, simple, exstipulate, perianth green inconspicuous
Amaranthaceae	pigweed	HS	4-5	0	4-5	(2-3)	utr, pyx	flws subtended by papery bracts, similar to goosefoot
Nyctaginaceae	four o'clock	HST	5	0	5	1	ach	bracts mimic sepals, sepals mimic petals, lvs simple, opposite stems tend to branch dicotomously
Portulacacaae	purslane	H	2	4-6	4-∞	2-8	cap	lvs often fleshy, cap dehisces longitudinal or circumscissle
Caryophyllaceae	pink	H	5 or (5)	5[0]	5-10	2-5	cap, utr	cap many seeded, lvs opposite, linear or lanceolate, stem nodes swollen
Ranunculaceae	buttercup	HS[V]	3-x	0-∞	∞	∞	fol, ach, ber	lvs often palmately dissected, exstipulate with a sheathing base
Cruciferae (Brassicaceae)	mustard	HS	4	4	4+2	(2)	sil, slq	petals cruciform, often clawed, often with acrid taste
Primulaceae	primrose	H	5	(5)	5	(5)	cap, pyx	plants mostly scapose, lvs simple, basal, opposite, stamens opposite petals
Saxifragaceae	saxifrage	HS	5[4]	5[4]	5 or 10	2	cap	hypanthium present, lvs alternate or basal, exstipulate
Rosaceae	rose	HST	5	5[0]	∞	∞(5)1	ach, drp, pom, fol	hypanthium present, lvs alternate, usually stipulate
Leguminosae (Fabaceae)	pea	HSTV	5	5 or 5z	5-∞	1	leg	lvs alternate, mostly compound, stamens usually 10
Euphorbiaceae	spurge	HST	0 or 5	0 or 5	1-∞	(3)	schizo	often with milky latex, fruit 3 nutlets, flws unisexual usually much reduced
Malvaceae	mallow	HST	3-5	5	∞	(5-∞)	cap, schizo	often with stellate pub, lvs alternate, palmately veined and/or lobed
Loasaceae	loasa	H	5	5	5-∞	(3-7)	cap	flws showy yellow to white, often with stinging or at least rough, bristly glochidiate hairs
Cactaceae	cactus	HS	x	∞	∞	(2-∞)	ber	usually spiny succulents
Onagraceae	evening primrose	HS	2 or 4	2 or 4	4 or 8	(4)	cap, ber, nutl	hypanthium present, stigmas often 4-lobed
Umbelliferae (Apiaceae)	parsley	H[ST]	5	5	5	(2)	schizo	typically with a compound umbel, stems hollow, lvs compound petioles sheathing at base
Gentianaceae	gentian	H	4	(4-5)	4-5	(2)	cap,ber	lvs opposite, exstipulate, basally connate, glabrous
Asclepiadaceae	milkweed	HSV	5	(5)	5	2	fol	often with milky sap, lvs opposite or whorled, corona and other specialized parts
Apocynaceae	dogbane	HSV	(5)	(5)	5	2	fol, ber, cap	often with milky sap, lvs entire opposite or whorled, carpels free at base, lacking specialized parts of milkweed
Convovulaceae	morning glory	HSV	5	(5)	5	(2)	cap, ber, nut	often with milky sap, twining herbaceous vines in N Hemisphere, corolla plaited
Polemoniaceae	phlox	H	(5)	(5)	5	(3)	cap	flws often funnelform or salverform, stamens often inserted at diff levels, 3 stigmas
Hydrophyllaceae	waterleaf	HS	(5)	(5)	5	(2)	cap	flws usually scorpioid, unilateral, bristly hairy
Boraginaceae	borage	H	5	(5)	5	(2)	nutl, ach, drp	ovary 4-lobed, scorpioid cymes, lvs simple, sessile, alternate, bristly hairy
Verbenaceae	verbena	HST	(5)	(5)z	2+2	(2)	drp, 2or4 nutl	lvs opp or whorled, single terminal style, stem often 4-angled
Labiatae (Lamiaceae)	mint	HS	(5)	(5)z	2 or 2+2	(2)	nutl, drp	ovary 4-lobed, 4-angled stems, style bifid at apex with unequal lobes
Solanaceae	nightshade	HSVT	(5)	(5)	5	(2)	ber, cap	lvs alternate
Scrophulariaceae	figwort	HS	(5)	(5)z	[2] 2+2[5]	(2)	ber, cap	ovary not 4-lobed, stamens usually didynamous with a sterile filament
Rubiaceae	madder	HST	4-5	(4-5)	4-5	(2)	ber, cap	stipules often leaflike, lvs opposite or whorled
Compositae (Asteraceae)	sunflower	HST	x	(5) or (5)z	5	(2)	ach	inflorescense in heads

Monocots

Family	Common Name	Form	K	C	A	G	Fruit Type	Miscellaneous Comments
Juncaceae	rush	H	3	3	6	(3)	cap	small grass-like herbs, 3-many seeded capsule, perianth scarious, green or brown
Cyperaceae	sedge	H	x	0	3	(2-3)	ach, nutl	grass-like, stems often 3-sided, solid, nodes not apparent
Liliaceae	lily	H	3	3	6[3]	3	cap, ber	fam often expanded to include Yucca and Agave
Agavaceae	agave	HS	3	3	6	(3)	cap, ber	flws subtended by spathelike bracts, lvs persisting in basal rosette
Orchidaceae	orchid	H	3	2+1z	1-2	(3)	cap	lip often elaborate
Gramineae (Poaceae)	grass	H	2-3	0	3	(2-3)	cary	glumes present, stems hollow with obivious nodes

Character Explanation

Form: T=trea, S=shrub, H=herb, V=vine

K=calyx, C=corolla, A=androecium (stamens), G=gynoecium (carpels)

Symbols: ⌒=fused by upper parts, ◡=fused by lower parts, G=ovary superior, $\overline{G}$=ovary inferior, Cz=corolla irregular, ()=parts united i.e. fused, [ ]=rarely, x=low unstable number, ∞=numerous

Fruit Types

achene = single seed tightly enclosed by the fruit wall as in sunflower family

nut = 1-seeded fruit with hard shell

nutlet = a small nut

caryopsis = seed and fruit wall fused

utricle = achene-like with seed loosely surrounded by fruit wall

achizocarp = compound dry fruit splitting into 1-seeded indehiscent segments

capsule = dry dehiscent several to many-seeded fruit of 2 or more carpals

silique = 2-valved capsule where walls peel away from central partition

silicle = silique not more than 2-3 times longer than wide

pyxis = capsule opening by a lid

leguma = unicarpellata, dehiscing along both sutures

follicle = unicarpellate, dehiscing along one suture

berry = fruit wall (paricarp) fleshy as in a grape

pome = inferior ovary where hypanthium forms fleshy fruit as in apple

drupe = paricarp divided into fleshy exterior and bony interior as in peach

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Conservation Resources
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